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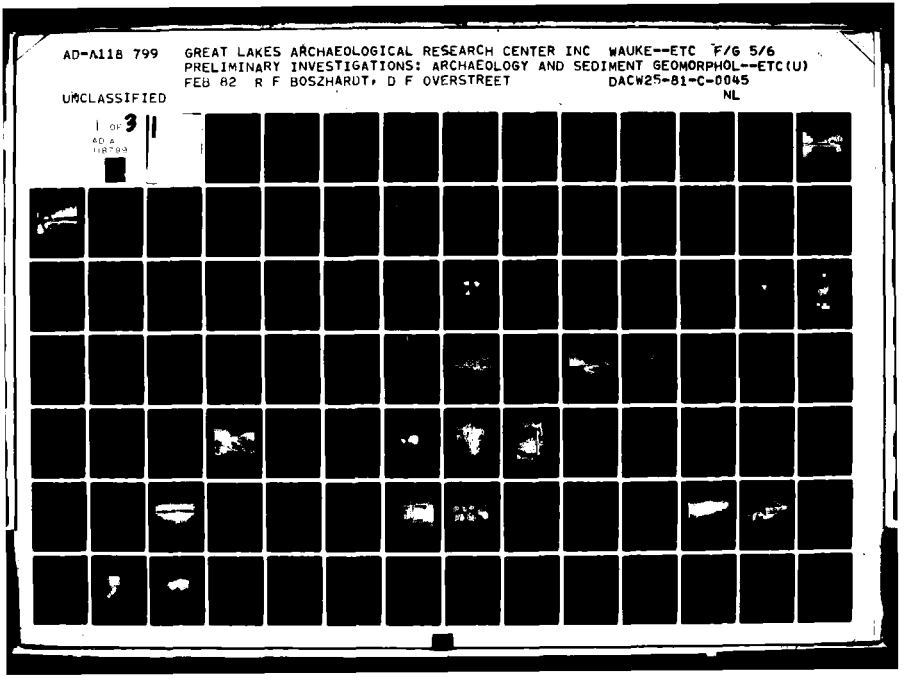

PRELIMINARY INVESTIGATIONS: ARCHAEOLOGY AND SEDIMENT GEOMORPHOLOGY, NAVIGATION POOL 12, UPPER MISSISSIPPI RIVER

ADDENDUM: ARCHAEOLOGICAL TESTING AND EVALUATION OF 11 Jd 126

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In fulfillment of:

CONTRACT NO: DACW25-81-C-0045
(P00002)

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ABSTRACT

On November 19, 1981, the Great Lakes Archaeological Research Center, Inc. was notified by the Rock Island District Corps of Engineers to proceed with evaluatory testing at 11Jd126, a threatened archaeological site in the lowland floodplain of Navigation Pool 12 in the Mississippi River.

The evaluation was geared towards determination of the sites eligibility to the National Register of Historic Places. The testing began late in November 1981 and efforts were severely hampered by poor field conditions. However, in the short amount of time expended at the site, it became clear that the site likely meets the criteria for eligibility to the National Register. In situ deposits consisting of a sheet midden and pit features were identified as representing Middle and Late Woodland components. The results of the testing have produced the first lowland floodplain adaptive strategy information for these periods within this region. Finally, recommendations for further archaeological investigation at this site are offered.

TABLE OF CONTENTS

Page No.

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACKNOWLEDGEMENTS

The archaeological testing at 11Jd126 would not have been possible had it not been for the full cooperation of the Dubuque Sand and Gravel Company. The personnel of this company not only facilitated our work by providing accessibility to and from the site, they also expressed sincere interest in the findings.

We are grateful for their help and concern.

INTRODUCTION

11Jd126 is a multicomponent site located in the lowland floodplain of Navigation Pool 12 of the Upper Mississippi River (Legal Description: Center S-1/2, SW-1/4, NW-1/4, SE-1/4, and NE-1/4, NE-1/4, SW-1/4, Section 3, T28N, R2W; U.T.M. Coordinates: 4702500-4702750N, 697700-6977200E). The site was originally located on August 13, 1981 during an archaeological survey of Pool 12 by Great Lakes Archaeological Research Center, Inc., for the Rock Island District Corps of Engineers (DAW25-81-C-0045).

During the survey, several collections were made along the eroding southeastern levee shore of Frentress Lake Slough, a side channel in the floodplain. These collections recovered a substantial amount of prehistoric artifactual materials including lithic debitage, ceramic sherds, burned bone and daub. The materials, although collected from redeposited contexts, suggested a nearly continuous scatter of cultural deposits beginning just above the mouth of the Menominee River and continuing to the northwest, conforming to the levee, for 250 meters.

Within the scatter of materials, several clusters of specific types of material remains were noted which implied differential activity areas. For example, all of the daub was recovered from a stretch of shoreline about 20 meters in length suggesting the possibility that a prehistoric structure is currently being eroded into the slough.

Corresponding to the distribution of the daub was a large quantity of burned bone. In addition, nearly all of the ceramic sherds recovered from the surface collections were located in a 20 meter stretch of shoreline, roughly midway along the levee. The sherds from this area were with few exceptions, extremely thin, grit tempered cordmarked body sherds indicating the presence of a Late Woodland component. During the initial survey, the depths of the cultural deposit(s) within the exposed 2 meter high eroding levee bank was not established.

On September 20, 1981, the site was revisited. Shortly before, a barge terminal construction project had begun which had partially impacted the southeast end of the site. The terminal project involved clearing vegetation and dredging a channel in a northerly direction beginning just above the present mouth of the Menominee River. By the time of the September visit, the project area had been cleared of vegetation removing several feet of surface soils in the process. In addition, the dredge had cut ca. 20 meters into the levee from the shore of Frentress Lake Slough creating an east-west profile (Figures 1 and 2). Brief examination of the cleared surface resulted in the recovery of a single chert core.

In the dredge cut profile, a buried shell lens was exposed (see Figure 2). At that time, it was not determined whether the shell midden was affiliated with historic or prehistoric activity.

On October 29, 1981, the shell midden was inspected by Mr. Charles Smith of the Rock Island District Corps of Engineers. By that time, the dredge had cut past the shell deposit on the east half of the terminal easement. A portion of the shell lens remained in the west bank of the dredge cut and Mr. Smith recovered several prehistoric artifacts from the bank, some of which were in apparent association with the shell. The materials included lithic debitage, ceramic sherds and bone. The indication of prehistoric age of the shell lens was the first such find in Pool 12.

Although the dredge had totally impacted an unknown extent of the site, the dredging this fall had been restricted to the east half of the planned channel. Thus, the west half of the site area within the terminal easement remained only partially disturbed from the surface clearing, but was scheduled for total impact in the next strip of dredging. Concern over the future of the remaining site area within the terminal easement resulted in a meeting at the Dubuque Sand and Gravel Company (East Dubuque, Illinois) on November 9, 1981. This meeting was attended by Dr. Margaret Kimball Brown of the Illinois State Historic

FIGURE 1: Dredging of Barge Terminal Channel-September 20, 1981

FIGURE 2: Dredge Cut Profile-September 20, 1981

Preservation Office, representatives of the Rock Island District Corps of Engineers, representatives of the Dubuque Sand and Gravel Company and a representative of Great Lakes Archaeological Research Center, Inc.

The meeting was preceeded by another visit to the site with all participants in attendance. During this visit, additional artifactual materials were recovered and a deep pit feature observed in the west side dredge cut bank. The cultural materials appeared to be restricted to a dark silt horizon which overlay a sand horizon. The pit feature intruded from the silt well into the sand. Examination of the dredge cut bank indicated the cultural deposit extended approximately 40 meters from the shore of Frentress Lake Slough, conforming to the width of the dredge bissected levee.

At the following meeting an agreement was reached whereby archaeological testing of the remaining site area within the easement would be conducted while conditions allowed prior to winter. The Dubuque Sand and Gravel Company was extremely cooperative in agreeing to postpone further dredging in the area of the easement which contained the site. Construction would continue to the north.

A testing plan was developed with the goals of determining the nature and potential significance of the cultural deposit(s) at 11Jd126. Specific objectives are outlined in the Field Services Section of the Pool 12 contract amendment (P00002).

Briefly, these include: (1) determination of the horizontal and vertical extent of the site, (2) identification of the number of cultural components and their respective chronological and stratigraphic positions, (3) interpretation of activities represented by the material remains for each component, (4) determining the relationship between the site, the environment and surrounding resources, and (5) evaluating the present condition of the site in terms of mitigation.

PHYSICAL SETTING

11Jd126 is located in the Lowland Floodplain of the Upper Mississippi River Valley within the margins of Pool 12. The Lowland Floodplain consists of islands and low extensions of mainland shores, backwater marshes, ponds and lakes, sloughs, side channels, and the main navigation channel of the river. These topographic features lie at elevations lower than 605' in this pool. The land forms are all post glacial in origin, being comprised of sand and silt sediments. These sediments cap deep deposits of Pleistocene sand and gravel outwash which partially fill the Mississippi trench. The depth of the Holocene deposits is unknown.

Holocene land forms rise 0-3 meters above the fluctuating water levels of the Pool. The highest relief are crests of linear levees which border present and past water channels. Although relatively flat, the floodplain lands undulate slightly from old channel scars, silted-in ponds, etc.

Lowland floodplain vegetation is distinct from the surrounding Pleistocene terraces and Uplands. Wet forest species, such as Silver Maple, River Birch, Elm and Cottonwood, dominate the moist land areas. Occasional Oaks, Hickory and Walnut may be found on the higher levee crests. Understory throughout the floodplain is dominated by Poison Ivy and Nettle beneath the forest canopy. Along exposed shorelines, Wild Grape, Elderberry and Sedge Grasses are frequent. In slow current areas, where siltation is most dramatic, the land and vegetation blends gradually to marsh habitat.

Faunal species of the Lowland Floodplain include a few traditional land mammals, such as squirrel and occasional White-tailed Deer. However, the lowland environs are rich in water related fauna. Riparian mammals, such as Beaver and Muskrat are common. In addition, waterfowl, fish and fresh water mussels (naiades) are plentiful.

Specifically, 11Jd126 is situated on an eroding levee (elevation 595-600'), which forms the northwest shore of Frentress Lake Slough (Figure 3). The back side of the levee is slightly undulating and continues to the north for .5 mile where it meets the base of a Pleistocene terrace (elevation 615'). The site is located just above the present mouth of the Menominee River.

Pre-1930's maps indicate a different hydrological setting for 11Jd126. The General Land Office Survey Plat map for the encompassing township (1839-40) and the Mississippi River Commission Chart No. 161 (1893) show the Menominee River bending to the southeast .25 mile north of 11Jd126 and having its former outlet 2.5 miles to the southeast of the present mouth. In addition, the present condition of Frentress Lake Slough appears to differ from its representation on the earlier maps. Comparison of Figure 3 to Figures 4 and 5 illustrates changes in the general hydrological features around 11Jd126 from 1840 to the present. These maps document the change in the location of the mouth of the Menominee River and of the configuration of Frentress Lake Slough. In addition, the earlier maps indicate former channel scars and sloughs which may reflect different early historic or prehistoric courses of these two channels. For example, Crooked Slough, now a minor back water body, may have been an earlier outlet of the Menominee River or, at one time, been a much more important side channel through the bottomlands in this area. Also, channel scars are indicated above Switzer Lake which might reflect earlier courses of inlets to Frentress Lake and Frentress Lake Slough at a time when this channel may have been substantially stronger than at present.

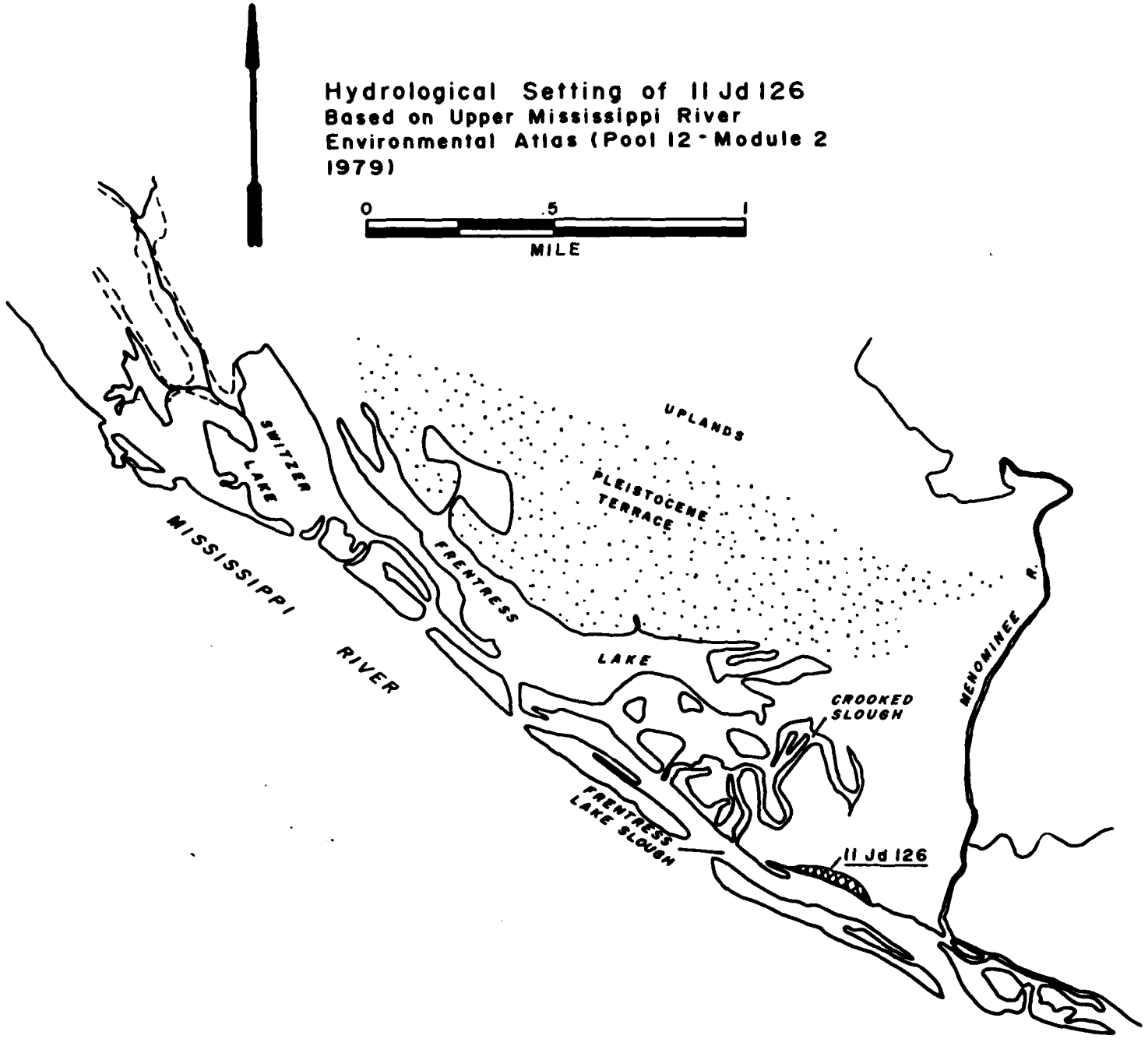


FIGURE 3: Present Hydrological Setting of 11Jd126

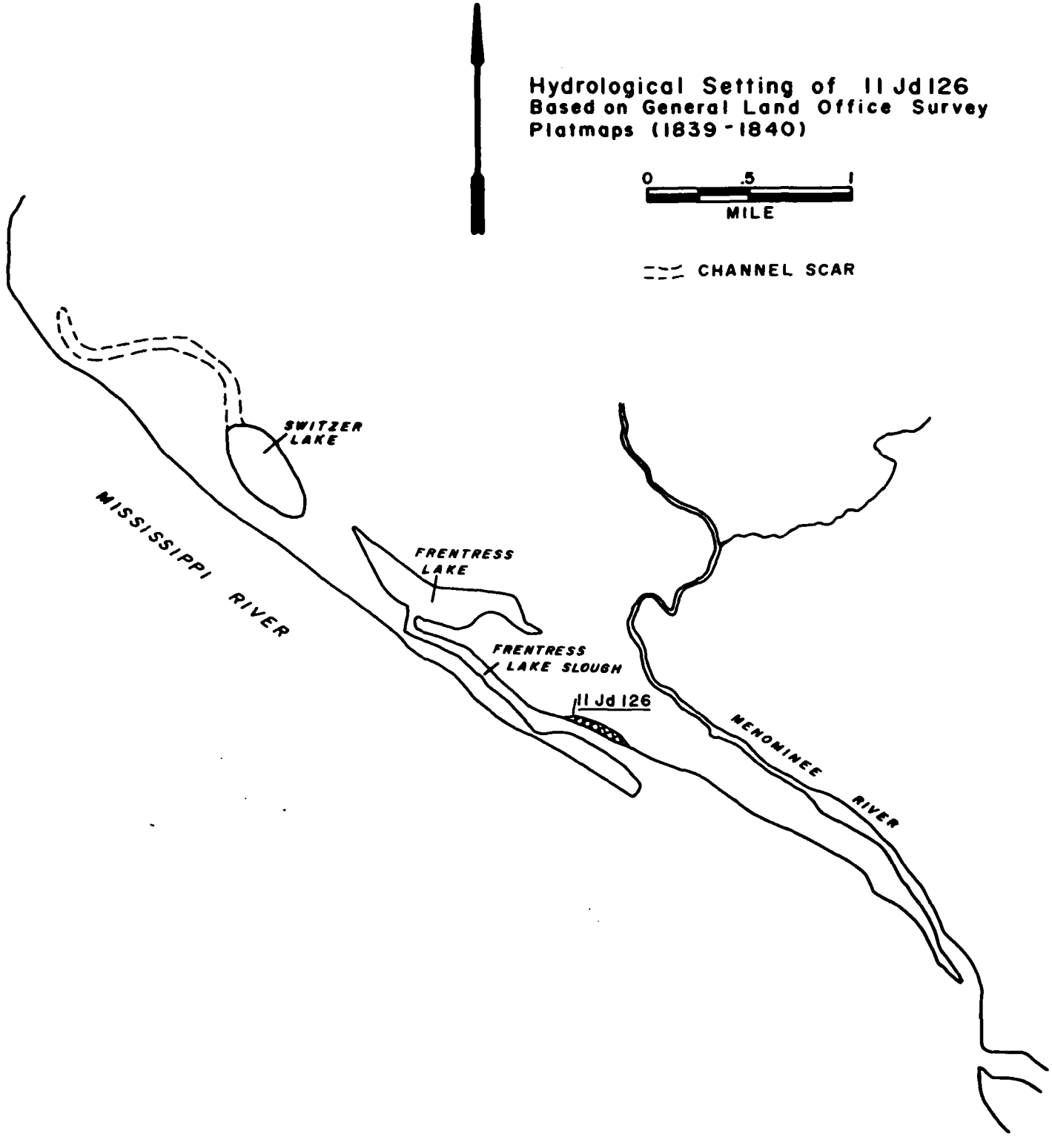


FIGURE 4: Hydrological Setting of 11Jd126-1840

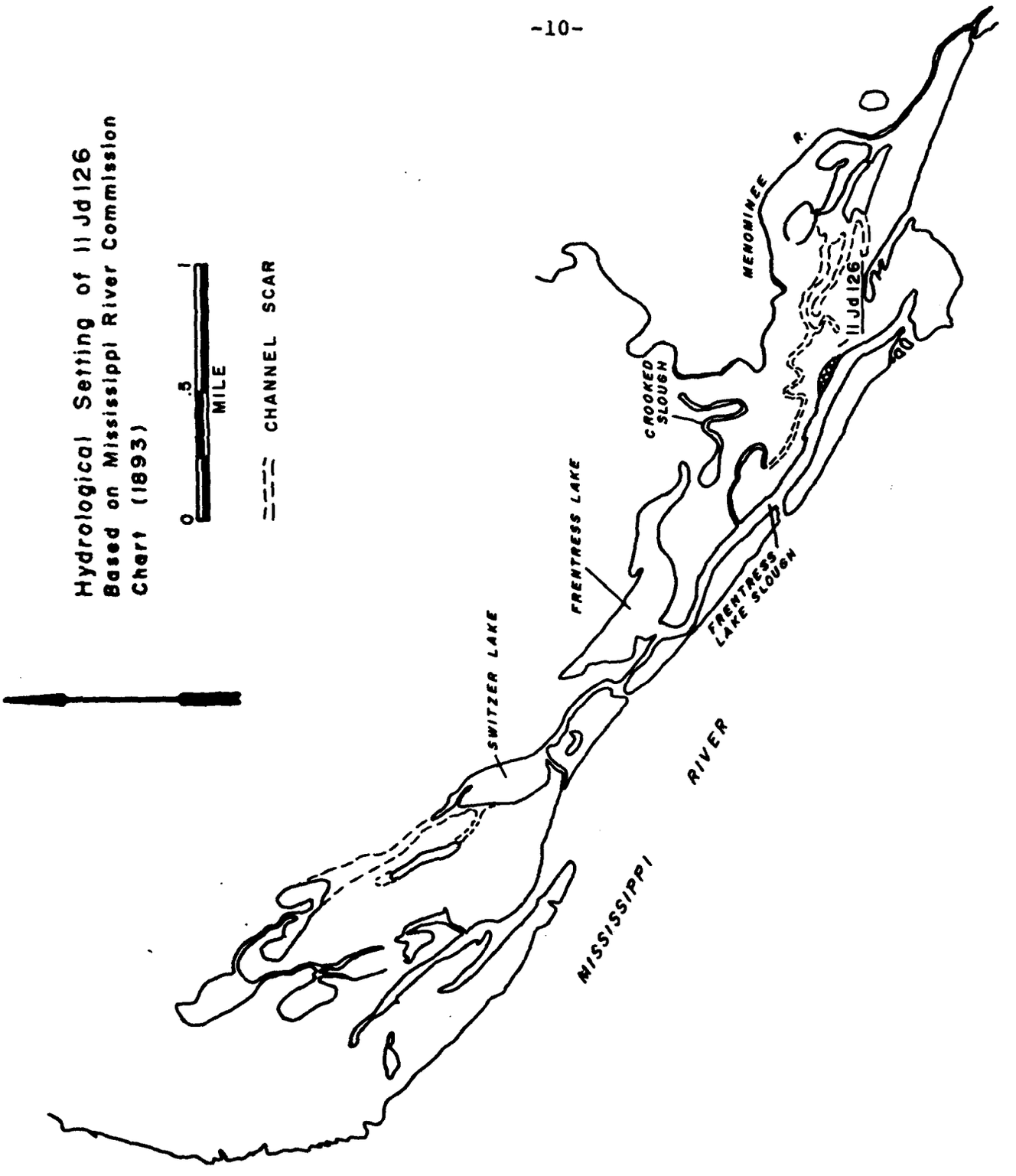


FIGURE 5: Hydrological Setting of 11Jd126-1893

In a letter dated March 5, 1982 (Appendix C) Dr. Richard C. Anderson of the Geology Department at Augustana College suggested a hypothesis for shifting main channel locations in the upper portion of Pool 12. This hypothesis argues that the main channel (thalweg) has migrated from the Illinois side to its present location along the Iowa bluffs (Figure 6). In such a model past thalwegs may be evident from channel scars, side channels and levees. Dating of the former thalwegs would be possible from cultural deposits located on the levees. Note on Figure 6 the second thalweg in Dr. Anderson's sequence. The course of the main channel during that era would have run through Frentress Lake Slough and along 11Jd126. Although this hypothesis was not tested during the Pool 12 investigations, the occupations at 11JD126 may have occurred when the main channel of the Mississippi River had been located in what is now Frentress Lake Slough.

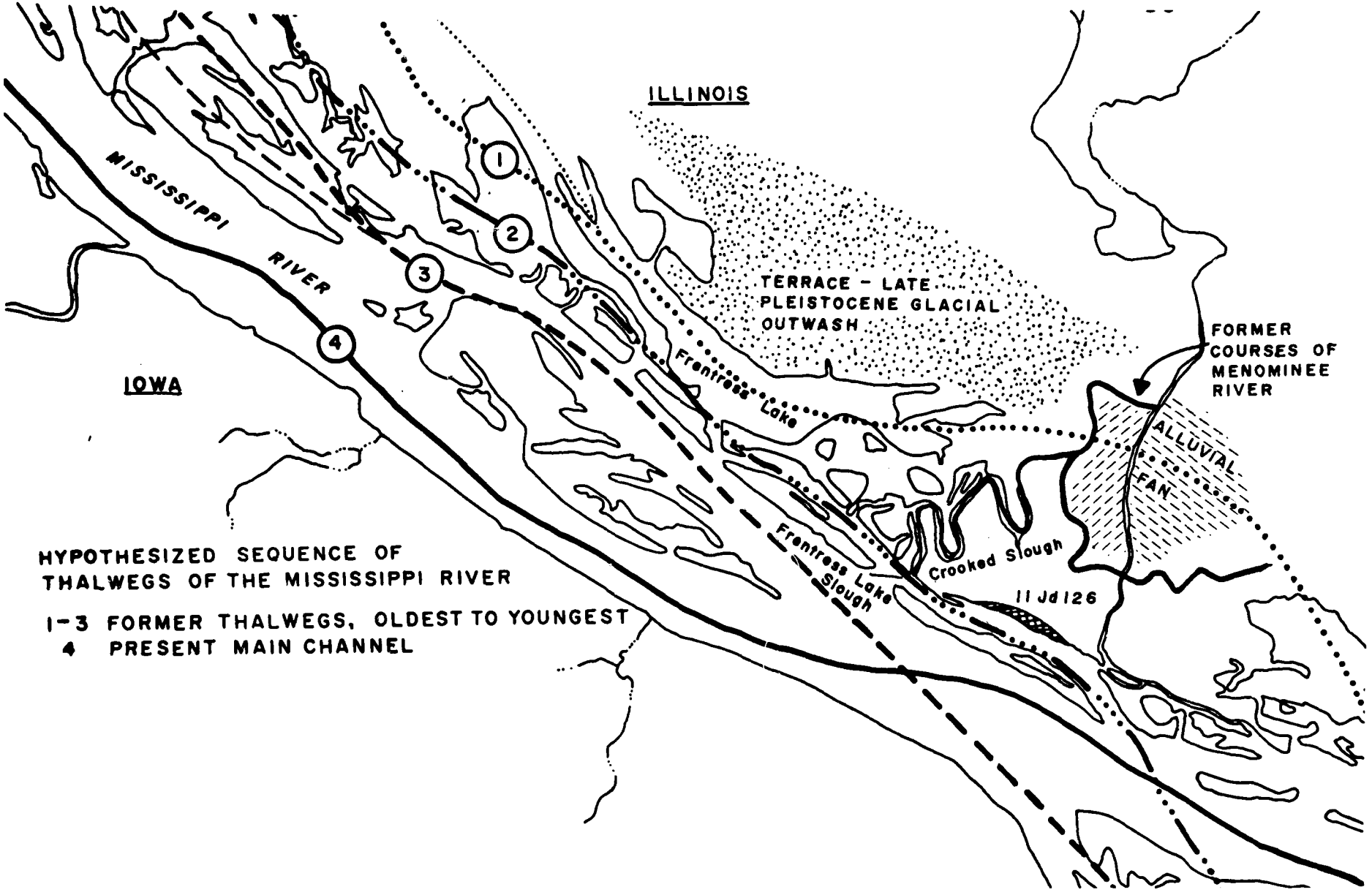


FIGURE 6: Hypothesized Sequence of Shifting Main Channel (Thalwegs) of Mississippi River during the Holocene.

PREVIOUS INVESTIGATIONS

Diagnostic artifacts recovered at 11Jd126 indicate two primary prehistoric occupations which are comparable to Middle and Late Woodland asemblages in the Upper Midwest. Previous archaeological investigations have identified several Middle and Late Woodland complexes to which the components at 11Jd126 show affinities. Early reports of burial mound explorations in the immediate vicinity of Pool 12 (e.g. Thomas 1884, 1981, Bennett 1945, and Orr n.d.(a), (b), and (c), include artifact descriptions which are comparable to those recovered at 11Jd126. However, these reports were written prior to definition of the now recognized culture history of the prehistory of the Upper Midwest. Unfortunately, detailed descriptions of Woodland habitation sites in the Pool 12 area are lacking. Therefore, component affiliation of the diagnostic materials recovered at 11Jd126 are necessarily based on comparison to previously defined prehistoric cultures from surrounding regions where more intensive archaeological research has been undertaken. These areas include the central Illinois River Valley, northeastern Iowa, and southwestern Wisconsin. A review of the pertinent literature from these areas was undertaken to allow accurate comparisons of the 11Jd126 components. These comparisons may be applied to Middle and Late Woodland components from other sites in the Pool 12 area.

The Illinois River Valley has been divided into three subregions: the Upper, Central and Lower areas (Wray 1952). Each of these three subregions has received archaeological attention for some time, and the prehistoric complexes of the Woodland segment of prehistory are well documented. Of the three Illinois River subregions, the Middle and Late Woodland remains of the Central area compare most favorably to those from Pool 12 and 11Jd126.

The Central area of the Illinois River lies 125-150 miles from Pool 12 and is separated by an expansive Upland region which is cross cut by the Rock River drainage. Because of the distance between the Central portion of the Illinois River and Pool 12, cultural comparisons are tenuous. However, because of the well established literature base of the Central Illinois River area, comparison cannot be avoided. Evaluation of suggested relationships between these areas is not yet possible or attempted.

Middle Woodland stage of the Central Illinois River is well documented from excavation of Hopewellian burial mounds and habitation sites and later Middle Woodland sites (Cole and Deuel 1937, Deuel 1952, Cantwell 1980). Diagnostic ceramics from this area were described and classified in a relative chronological order by Griffin (1952). Griffin's classic report defined three ware groupings, including Havana, Hopewell and Weaver. Each of these wares include types characterized with decoration placed on a smoothed surface. This motif is a primary diagnostic attribute of Middle Woodland ceramics. Chronologically, Havana and Hopewell wares are thought to represent the same period of time with Hopewell types much finer in quality and often found in mortuary contexts. Weaver ware is considered to represent a later period and represents the transition from Middle to Late Woodland.

Havana ware vessels are generally thick with straight vertical walls and flat or inward bevelled lips. Temper is frequently large crushed grit particles. Hopewell ware is usually noticably thinner than Havanna ware and is often tempered with limestone. Weaver ware is similar to Hopewell ware in vessel thicknesses, and decorative attributes from Havana and Hopewell wares continue. Temper is generally smaller grit temper than Havana ware and vessel shape becomes more globular.

Middle Woodland lithic types for Illinois have been summarized by White (1968). A major portion of the artifacts analyzed by White originated from sites of the Central portion of

the Illinois River Valley. Middle Woodland projectile point and knife forms which are affiliated with Havana and Hopewell ceramics include ovate blade corner notched types, such as Snyders, Manker and Norton. Projectile points associated with Weaver ceramics are characterized by expanding stems, such as the Steuben type.

Cantwell's recent discussion of Middle Woodland components at the Dickson Camp and Pond sites in the Central Illinois River summarized the chronological placement of the ceramic groups described above (1980:113). The ages are 200 B.C. - A.D.400 for Havana and Hopewell (with Hopewell probably restricted to post A.D.150), and A.D.400-700 for Weaver ware ceramic components.

The Late Woodland period of the Central Illinois Valley is less well known than the Middle Woodland, however, a relatively large literature base exists for these components, as well. Late Woodland in this area has been termed Tampico, Maples Mills and Canton ware (Fowler 1952:138). These names refer to one burial mound and ceramic complex. For convenience, this report will utilize the Maples Mills designation.

Maples Mills has been discussed by several authors (e.g. Cole and Deuel 1937, Schoenbeck 1946, Wray 1952, Logan 1976, Green 1976, Benn 1980 and Riggle 1981). The most distinctive diagnostic element of this complex is the associated ceramics which are cord impressed. The vessels are often distinct from other Upper Midwest Late Woodland cord impressed groups in having squared orafices, with castellated rims, and frequently exterior lug handles. The distribution of Maples Mills is primarily restricted to the Central Illinois Valley (Benn 1980:97).

Green (1976:179-183) re-reported radiocarbon dates for features containing Maples Mills and other ceramic types as A.D. 1000 and 1230. Recently, Riggle (1981) has suggested that Maples Mills may have developed locally in western Illinois beginning as early as A.D. 700.

NORTHEASTERN IOWA

The Woodland complexes of Northeastern Iowa may be used to compare the materials from 11Jd126 primarily due to the works of Logan (1976) and Benn (1976, 1980). This area should be highly relevant to the archaeological record of Pool 12 due to its proximity.

The Middle Woodland period in Northeastern Iowa is recognizable from sites which are similar in many respects to the Middle Woodland complexes in the Illinois River Valley. Mound attributes, ceramics and lithic types compare favorably to those defined in Illinois. Logan and Benn have developed regional terminology for Northeastern Iowa which includes the McGregor Phase for the Middle Woodland of Hopewellian times, and the Allamakee Phase which is represented by Linn ware ceramics and expanding stemmed projectile points. Linn ware shows many affinities to Weaver of Late Middle Woodland in Illinois.

Late Woodland in Northeastern Iowa is quite distinct from contemporary Illinois Valley Complexes. Northeastern Iowa is the western edge of the distribution of effigy mounds, which are absent in the Illinois Valley. However, small conical Late Woodland mounds are common to both areas.

Diagnostic Late Woodland artifacts of Northeastern Iowa are represented by Madison ware (cord or fabric impressed) and small triangular projectile points. Madison ware is similar to Maples Mills in having cord impressions as the primary decorative element. However, Madison ware is not known to have squared orafices, castellations and lug handles, such as is typical of Maples Mills.

Madison ware ceramics have been found in association with effigy mounds at numerous sites in northeastern Iowa and throughout southern Wisconsin (Rowe 1956, Hurley 1975, Logan 1976, Benn 1976, 1980). Radiocarbon dates from effigy mounds place the time span for Madison ware between A.D. 650-1200 (Benn 1979:74).

A second Late Woodland ceramic type is also found in Northeast Iowa, although it appears to center in East Central Iowa to the south and west of the extent of effigy mound distribution. This type is termed Minotts Cord Impressed and is discussed by both Logan (1976) and Benn (1980).

The primary distinction between Minotts and Madison Cord/Fabric Impressed is the size or gauge of the cordage utilized in roughening the exterior surface and decorating (Logan 1976:103). Minotts Cord Impressed typically has relatively thick cord impressions in contrast to fine, tightly twisted (and possibly woven) Madison ware cordage. Benn has suggested that both Madison and Minotts Impressed vessels were at least occasionally made and decorated with a loosely woven fabric (1980). Minotts Cord Impressed vessels also do not have squared orifices, castellations of lug handles.

Minotts Cord Impressed apparently has not been absolutely dated as yet. However, Benn (1980:94) suggests Minotts begins to be manufactured 100 years later than the Madison ware.

SOUTHWESTERN WISCONSIN

The Middle and Late Woodland Complexes known from southwest Wisconsin are nearly identical to northeast Iowa. Stoltman (1979) has summarized the Middle Woodland communities for this area. Diagnostic artifacts again resemble those defined in Illinois. However, several regional type names have been employed for southwest Wisconsin. Stoltman defines the Trempealeau Phase for Hopewellian Middle Woodland sites in southwestern Wisconsin and utilizes the Millville Phase for later Middle Woodland sites which correspond to the McGregor and Allamakee Phases in northeastern Iowa, respectively.

Late Woodland in southwest Wisconsin is represented by effigy mounds, Madison ware ceramics and triangular projectile points (Rowe 1956). Middle and Late Woodland diagnostic

materials are primarily known from terrace and upland sites in this area. However, Boszhardt (1982) has recently described a comparable ceramic and lithic sample from the Floodplain of the Mississippi River in Pool 10 approximately 60 miles north of 11Jd126.

Archaeological investigations in the immediate vicinity of Pool 12 document Middle and Late Woodland occupation and burial activity. In the late 1800's, agents of Cyrus Thomas explored a group of conicals on the bluff top at East Dubuque, Illinois, approximately 3.5 miles up river from 11Jd126. Thomas' reports of these investigations describe mound characteristics which are of unquestionable Hopewell affiliation (1884:34-40, 1891:112-117). Bennett's (1945) classic report of mound and habitation investigations in Jo Daviess County, Illinois from the turn of the century to the 1930's reports Middle and Late Woodland burial mounds consisting of large and small conicals, linears, and a few effigy forms. From several of the mounds and most of the habitation sites, ceramic and projectile point forms can be affiliated with Middle and Late Woodland types. Middle Woodland ceramics are described as Naples Stamped types. Late Woodland Ceramics are described as Lake Michigan ware (=Madison ware) and occasional Maples Mills. Middle Woodland lithic types are not clearly represented, however, several expanded stemmed points are illustrated indicating late Middle Woodland occupation. Numerous examples of triangular points are reported adding to the Late Woodland evidence in this area. In the 1920's-1930's, the Iowa Archaeological Survey conducted excavations along the Mississippi River and investigated two groups of conical mounds near the south end of Pool 12, (Orr, n.d.:6, Logan 1976:12-17). The results of these investigations suggest some Hopewellian influence and later Middle Woodland construction.

The 1980 survey of Pool 12 documented Middle and Late Woodland occupation at a number of sites within the Lowland Floodplain. The component affiliations of the sites reported

during that survey (Volumes 1 and 2 of this report) were based primarily on ceramic comparison. The diagnostic ceramics from Pool 12 were affiliated with Hopewell ware, Havana ware, Weaver or Linn ware, and Madison ware. Hopewell ware was represented by a single sherd recovered at 11Jd127 located less than a mile from 11Jd126. Havana ware, Weaver/Linn ware and Madison ware ceramics were recovered at several sites including 11Jd125 and 11Jd128, both located along Frentress Lake Slough to the northwest of 11Jd126. Thus, the recovery of Middle and Late Woodland materials at 11Jd126 was not expected.

METHODS

Testing at 11Jd126 was complicated by poor field conditions. A period of prolonged precipitation delayed beginning the field work until November 23, 1981. By that time, night-time temperatures had steadily reached freezing and thawing day temperatures created a slick muddy surface on the cleared easement. These conditions interfered with access to the site and accelerated slumpage of the dredge cut bank. Furthermore, trowelling and shovelling were difficult and screening impossible.

Despite the adverse conditions, field investigations were undertaken and the data gathered address the basic goals of the testing project. Testing methods consisted of (a) establishing a site grid, (b) surface collections, (c) clearing the dredge cut bank, (d) excavation of features, and (e) soil coring and shovel cuts along the levee. The information derived from these investigations allow (1) estimation of the horizontal and vertical extent of the cultural deposits, (2) identification of cultural components, (3) recognition of various prehistoric activities, (4) interpretation of the relationship between the site and its prehistoric surroundings (including geomorphological setting) and (5) evaluation of the present condition of the site. Each of the latter topics will be discussed in the RESULTS section of this report.

SITE GRID

Horizontal control of *in situ* finds was maintained by establishing a metric grid in the easement portion of the site. An arbitrary datum point was selected on the undisturbed levee crest just west of the boundary of the cleared easement. From this point, an east line was shot utilizing a transit and tape to the dredge cut bank (a distance of just over 27 meters). At grid

point ON, 27E a north-south line was established with a Brunton Compass and tape, and grid points marked at 2 meter intervals. The north-south line roughly parallels the edge of the dredge cut bank allowing provenience of dredge cut finds to be recorded with grid coordinates.

SURFACE COLLECTIONS

Artifactual materials were collected from disturbed contexts on the surface of the cleared easement and from the foreshore at the base of the eroding levee bank along Frentress Lake Slough. Exact provenience of the materials recovered during these collections was not established due to the likelihood of previous horizontal displacement by heavy machinery used in clearing the easement surface and bank slumpage combined with river current along Frentress Lake Slough. However, the general extent of the surface remains was recorded under the assumption that these distributions approximate the horizontal extent of the remaining cultural deposits at 11Jd126.

CORING AND SHOVEL CUTS

Geomorphological questions regarding the origins and depositional sequence of the 11Jd126 levee required data collection of soil samples from vertical columns and description of soils in exposed profiles. Dr. Richard Anderson of the Geology Department at Augustana College assisted these efforts with an on site visit during which time a controlled soil column was collected from the dredge cut profile, and two 3" diameter cores were taken at locations on the undisturbed levee to the northwest of the easement. The cores extended over 1.5 meters below the surface with soil samples being collected at 20cm. intervals. These samples have been processed by pipette analysis and fine screening by Dr. Anderson.

In addition, the extent of the lower sand horizon was traced in the dredge cut profile and along the eroded bank of Frentress Lake Slough. The extent of the sand horizon along Frentress Lake Slough was measured by cutting a clean profile section of the eroding bank at 25 meter intervals and measuring the depth of the surface of the sand.

DREDGE CUT PROFILE

As noted earlier, slumpage of the unprotected dredge cut bank had occurred. The slumped soils were trowelled and cleaned from the bank to expose undisturbed soils and cultural deposits in the dredge cut profile. Materials recovered from the slumped soils were grouped by general descriptive horizontal provenience under the assumption that the slumped soils had lost vertical context while moving only slightly from the original horizontal provenience.

The non-disturbed dredge cut profile was cleaned with skim shovel and trowel. Materials located during the cleaning of the intact bank were collected and recorded by horizontal and vertical provenience. In addition, close observation was made of the dredge cut profile in an attempt to discern soil or material anomalies which might indicate pit or other types of features.

FEATURES

Several features were located in the dredge cut profile upon clearing. These features were all mapped on the site grid and in profile. Because of the precarious position in the exposed dredge cut profile, an attempt was made to excavate the features. Excavation methods involved careful trowelling of the deposits, collection of soil samples for flotation, maintenance of vertical control through natural or arbitrary 10 cm. levels, and record-keeping by means of notes, mapping and photography.

LABORATORY ANALYSIS

Upon returning to the laboratory at the Great Lakes Archaeological Research Center, all materials collected in the field, with the exception of the soil samples, were washed and catalogued by provenience designations. Soil samples were processed by drying, floting light fractions, and fine screening heavy fractions. Light fraction materials greater than 40 mesh (over .0425 mm.) and heavy fractions greater than 20 mesh (.841 mm.) were saved and sorted under a 10 power stereoscopic microscope. Processed soil sample volumes were recorded for quantitative comparison between proveniences.

RESULTS

SURFACE COLLECTION

11Jd126 Shoreline Frentress Lake Slough

During the period of testing at 11Jd126, the water level of Pool 12 was at a relatively low stage exposing a foreshore approximately 5 meters wide below the eroding levee bank along Frentress Lake Slough. Lithic debitage and ceramics were recovered from redeposited contexts along this shore from the easement area to the northwest for a distance of ca. 250 meters where the levee is interrupted by a narrow outlet of a back water slough. This collection verified the distribution of materials recovered during the surface collections in August when the site was originally located.

Several clusters of different material artifacts were noted and materials separated by these general provenience. Approximately 140-160 meters northwest of the testing grid datum point, numerous fragments of fiber tempered daub were recovered. Corresponding to this shoreline area was a substantial amount of burned bone. No diagnostic artifacts were recovered at this area. The presence of the daub suggests the possibility that a prehistoric structure is being eroded at that locality.

Approximately 100 meters northwest of datum a concentration of thin, grit tempered ceramic sherds were recovered. Although ceramic sherds were recovered from other areas of the shoreline, the uniformity and quantity of the sherds recovered at this section of the eroding levee implies a Late Woodland component being eroded.

A few diagnostic materials were recovered during the shoreline surface collection immediately south of datum at the west edge of the barge terminal easement boundary. These include one cord impressed rim sherd (Figure 7a), a fabric impressed body sherd (Figure 7b) and the base of a straight stemmed point/knife (Figure 7c). The decorated ceramic sherds are both grit

FIGURE 7: Diagnostic Artifacts Recovered from Shoreline Surface Collection

tempered. The rim sherd is 3mm thick, the body sherd is 4mm thick. The cord impressions on the rim sherd run in oblique parallel lines originating 4mm below a pointed lip. On the exterior lip above the oblique cord impressions are vertical cord twist impressions spaced at irregular intervals. The interior is smooth and contains no decoration. This rim sherd is slightly everted. The fabric impressed sherd contains two bands of tightly woven fabric impressions which are not parallel to one another. Between the fabric impressions is an area of fine cord marking. Both of these sherds indicate Late Woodland occupation at the easement area of the site.

The straight stemmed point/knife is represented only by the base. The implement had been broken just above the shoulders which begin at different distances from the bottom corners of the squared base (9 and 13mm). The base exhibits no sign of grinding. Straight stemmed points have been affiliated with Early Woodland components in the midwest and are referred to as Kramer and Liverpool Stemmed (Munson 1971, White 1968, Linder 1974).

Table 1 lists the materials recovered from the various areas of the shoreline surface collection.

A second surface collection was made of the cleared surface of the remaining portion of the site within the terminal easement. As noted earlier, the surface of the easement had been stripped of vegetation with heavy machinery. This surface was heavily scarred with machinery tracks indicating that any of the surface finds were likely moved from their original horizontal provenience for an indeterminable distance. The depth of surface soils removed from the easement appears not to have been equal across the site area. From the west boundary of the easement, the cleared surface tapers to the east to the dredge cut bank. Along the west boundary of the easement to non-disturbed land, an estimated 0-10cm of surface soil was removed. The cleared surface at the dredge cut bank (25 meters to the west) appears to be nearly one meter lower. Assuming the original surface was roughly level, the clearing from west to east may have cross-cut

TABLE 1

Shoreline Surface Collection (140-160 Meters Northwest of Datum)

CERAMIC

Fiber tempered (Daub) (10)

ORGANIC

Bone (1 burned)

Shoreline Surface Collection (100 Meters Northwest of Datum)

CERAMIC

Undecorated Body-grit tempered (4 cordmarked, 9 exfoliated)

HISTORIC

Metal (1 rusted fragment)

ORGANIC

Charcoal (1)

Shoreline Surface Collection (General)

LITHICS

Unretouched Flakes (5: 1 shatter)

CERAMIC

Undecorated Body-grit tempered (2 smoothed over cordmarked)
Undecorated Body- ? tempered (1 smoothed)

Shoreline Surface Collection (South of Datum and Easement)

LITHICS

Unretouched Flakes (4: 1 shatter)
Biface (1)
Straight Stemmed Projectile Point (1 base fragment)
Fire-cracked rock (3: 2 limestone, 1 ?)

CERAMIC

Rims-grit tempered (1 cord impressed)
Decorated Body-grit tempered (1 fabric impressed)

HISTORIC

Brick (1 fragment)

cultural deposits. Artifactual materials were recovered on this surface from the west boundary to the dredge cut, and from the shore of Frentress Lake Slough to the north for ca. 40 meters. Table 2 lists the cultural materials recovered from this surface collection.

A single small rim sherd was recovered from the surface of the cleared easement which had no indication of tempering when examined under 10 and 20 power stereoscopic microscope. This sherd is 2.5mm thick and is decorated with tightly spaced punctations (Figure 8). The punctations are 1mm in diameter and 1mm deep. The depth of the punctations is evident of the interior surface as merged nodes. The exterior surface appears to have been smoothed prior to application of the decoration. Component affiliation of this sherd is not certain. The extreme thinness suggests Late Woodland affiliation, and punctations are an infrequent decorative element of Upper Midwest Late Woodland ceramic types (e.g. *Madison Punctated*; Hurley 1975:102). However, the smooth surface might also indicate a late Middle Woodland component, such as the type Levsen Punctated (Logan 1976).

The grit tempered cord impressed body sherds were also recovered from the surface of the easement. One of these sherds is 4mm thick, and has two parallel cord impressed lines placed on a smooth surface (Figure 9). These basic attributes suggest similarities to the type Lane Farm Cord Impressed (Logan 1976, Benn 1979, 1980). This type is thought to represent a transitional Middle to Late Woodland Period when cord or fabric impressing is introduced as a ceramic decoration (Benn 1980: 78, 94).

The second decorated body sherd from the easement surface has a complex pattern of cordage impressions which possibly reflect a fabric (Figure 9). This sherd is 6mm thick. There is no indication of vessel surface treatment onto which the impression decoration was applied, precluding use of this criterion to distinguish between Lane Farm Cord Impressed and

TABLE 2

LITHICS

Cores (5: 1 basalt, 1 bipolar core)
Unretouched Flakes (11: 1 basalt, 10 shatter)
Hammerstone (1 basalt)

CERAMIC

Rims-grit tempered (1 punctated)
Decorated Body-grit tempered (2 cord impressed)
Undecorated Body-grit tempered (4: 2 cordmarked,
2 smoothed-over cordmarked)

ORGANIC

Bone (2 unburned)
Shell valves (2)
Charcoal (1)

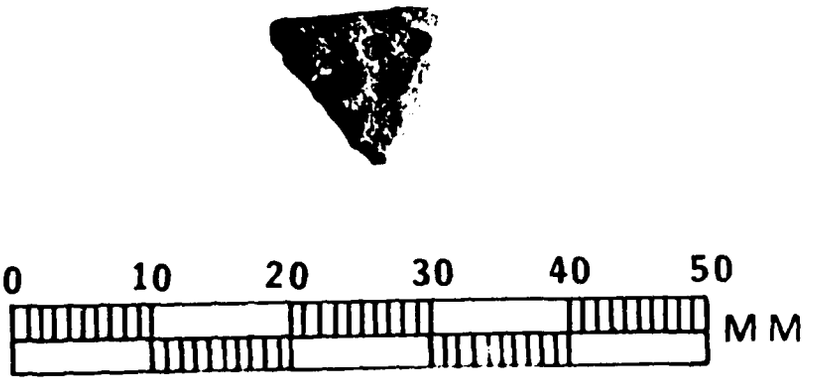


FIGURE 8: Rim Sherd Recovered from Surface Collection of Cleared Easement.

FIGURE 9: Decorated Body Sherds Recovered from Surface Collection of Cleared Easement

true Late Woodland types (e.g. Madison Cord/Fabric Impressed, Minotts Cord/Fabric Impressed or Maples Mills Cord Impressed). However, the complexity of the impressed decoration imply that this sherd originated from a Late Woodland vessel.

Several of the non-decorated body sherds collected from the surface of the easement also may be affiliated to a Late Woodland component. For example, the grit tempered sherds from this area range in thickness from 1 to 3mm. Late Woodland ceramics recovered from the lowland floodplain of Pool 10, near Prairie du Chien, Wisconsin, represented the only vessels with sherd thickness as thin as these body sherds (Boszhardt 1982).

CORING AND SHOVEL CUTS

Dr. Richard C. Anderson, of the Geology Department at Augustana College, visited the site during the field phase of the testing at 11Jd126, and aided initial interpretation of the geomorphological deposits at the site. These initial interpretations were based on visual inspection of the dredge cut bank and of the eroded levee bank along Frentress Lake Slough. These observations discerned an upper silt horizon capping a lower sand horizon at the easement area of the levee. The depths and extent of these deposits were traced for comparison to the cultural deposits.

Along the dredge cut bank, where approximately 50 to 100cm of soil is inferred to have been removed during clearing of the easement, the remaining silt horizon was 30-40cm thick. This horizon covered the sand along the entire cut except a small area near Frentress Lake Slough where the sand had been exposed at the cleared easement surface. The lower sand horizon extended from the base of the silt to the level of the water during the testing. In a generally north-south cross-section of the levee along the dredge cut link, the sand horizon was measured from the shore of Frentress Lake Slough to the north for 30 meters where it dipped below the water (Figure 10).

Dr. Anderson detected faint lensing within the upper cm. of the sand horizon in the dredge cut bank. A soil column (Section 1) was excavated from the dredge cut bank at grid point ON, 27E, and soil samples were collected for detailed analysis. In addition, a soil core (Core 1) was taken at the crest of the levee outside of the easement immediately adjacent to grid datum point (ON, OE), and samples were collected from 20 cm. intervals for analysis. The results of the soil analyses from these two collecting stations are summarized in Figure 11 and Appendix C.

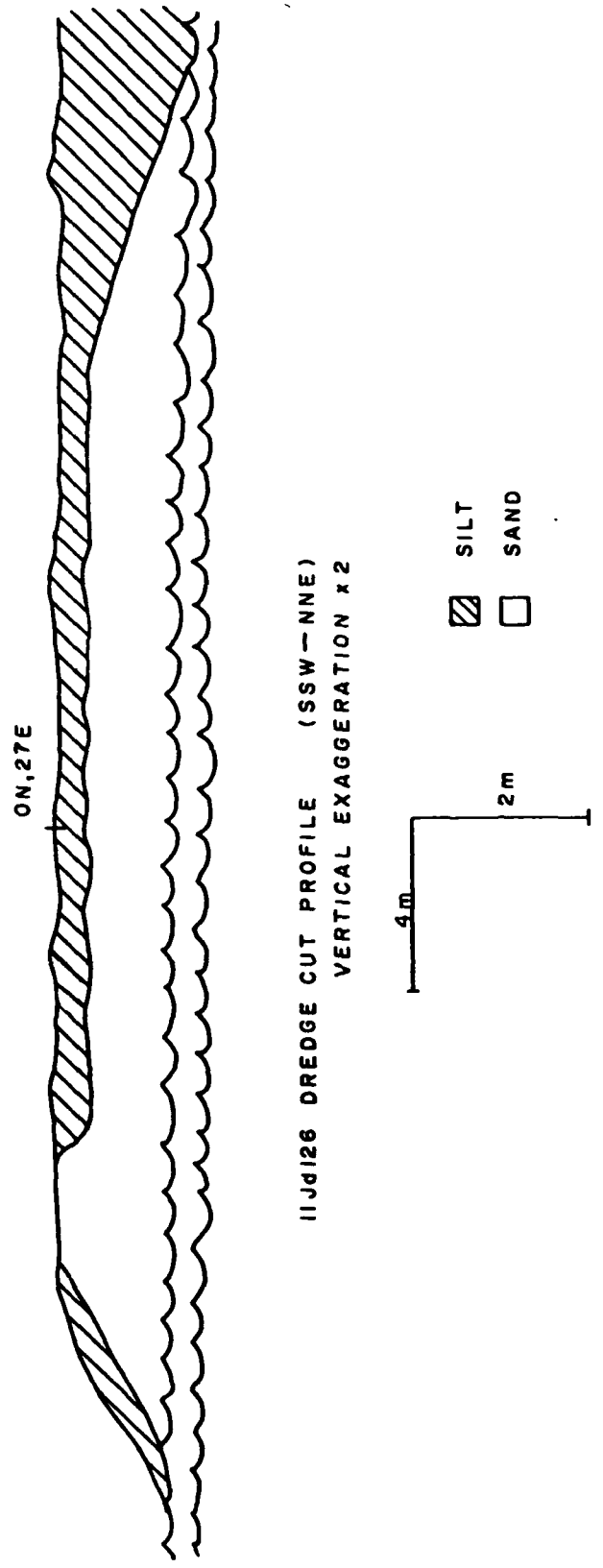


FIGURE 10: Dredge Cut Profile Soil Horizons

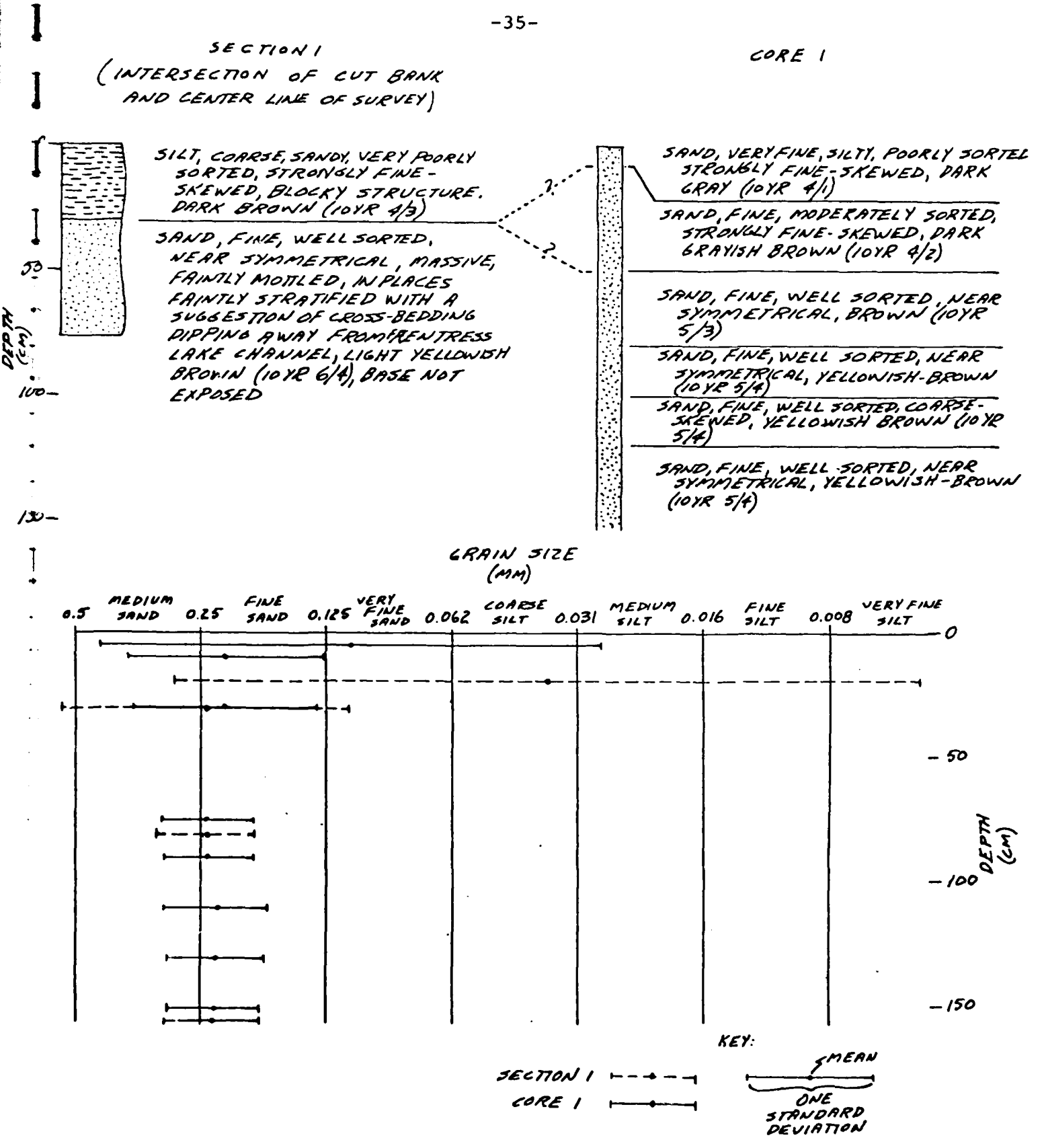


FIGURE 11: Section 1 and Core 1 Profiles, and Size Grain Measurements

To summarize the results of the soil analyses from the column (Section 1) and the core at datum (Core 1), it was found that the lower sand horizon consists of uniform size (well sorted) particles. This may reflect rapid deposition during a strong current episode. Only the uppermost levels of the sand horizon showed slight undisturbed stratification.

The silt horizon was unstratified and the soils exhibited a blocky structure indicating advanced soil development. However, the silt horizon differed between Section 1 and Core 1. It should be noted that on Figure 11 the surface of the Section 1 profile is the disturbed surface of the cleared easement and does not represent the same elevation as the surface of the Core 1 profile on the undisturbed levee crest. Thus, the original thickness of the silt horizon of Section 1 is unknown although 30 cm. remained after stripping an estimated 50-100 cm. of soil during the vegetation clearing within the easement. The 30 cm. of silt at Section 1 consisted of much purer sediments than those collected at Core 1. At Core 1 pure sand was reached at a depth of 30 cm. below the undisturbed levee surface. The overlying 30 cm. consisted of a mixture of fine sand and silts.

Interpretation of fluvial formations represented by these soil columns is that they are typical of natural levee formations. The upper horizon on the undisturbed levee crest (Core 1) may represent a single flood episode. The silty sediments off the levee crest, such as those observed in the dredge cut bank, were probably laid down by multiple floods of lesser intensity. The lack of observed stratification at each of these areas is probably a result of post depositional disturbances such as frost heaving, animal burrowing (e.g. crawfish, worms, etc.) or man related activites. Interestingly, cultural stratigraphy may not have been adversely affected by such disturbances, and indeed intact cultural deposits were evident (e.g. the shell lens).

The extent of the sand horizon was also traced along the eroded levee bank of Frentress Lake Slough. It was immediately apparent from visual inspection during the surface collection

that the lower sand horizon did not form the base of the entire levee, although cultural deposits are represented along the entire levee. Shovel cuts were made along the eroded levee bank at 25 meter intervals beginning at datum, and the depth of the soil change from silt to sand recorded. The results of these shovel cuts are:

LOCATION ON LEVEE EDGE	DEPTH OF SAND HORIZON
Datum	Sand at 30cm below surface
25 meters northwest of datum	Sand at 30cm below surface
50 meters northwest of datum	Sand at 110cm below surface
75 meters northwest of datum	No sand, silt to 160 cm. below surface

These readings document that the sand horizon underlies silt from the dredge cut bank to 50-75 meters northwest of datum (a total distance of 75-100 meters) (Figure 12). There is evidence that the sand horizon extended only a short distance to the south where the dredge channel exists. The east side of the dredge cut shows the levee profile clearly (Figure 13). Inspection of this cut revealed that the levee at that cut (ca. 25-30 meters across from the west side cut bank) consists only of silts. Further, examination of the photograph of the dredge cut on September 20 (See Figure 2) indicates the lower sand horizon dipping to the water within what is now the dredged channel. Thus, the original extent of the sand horizon beneath the silt is estimated to have been 100 meters northwest-southeast by 30 meters north-south, and occurring only at the southeast end of the 250+ meter long levee which contains cultural deposits of 11Jd126.

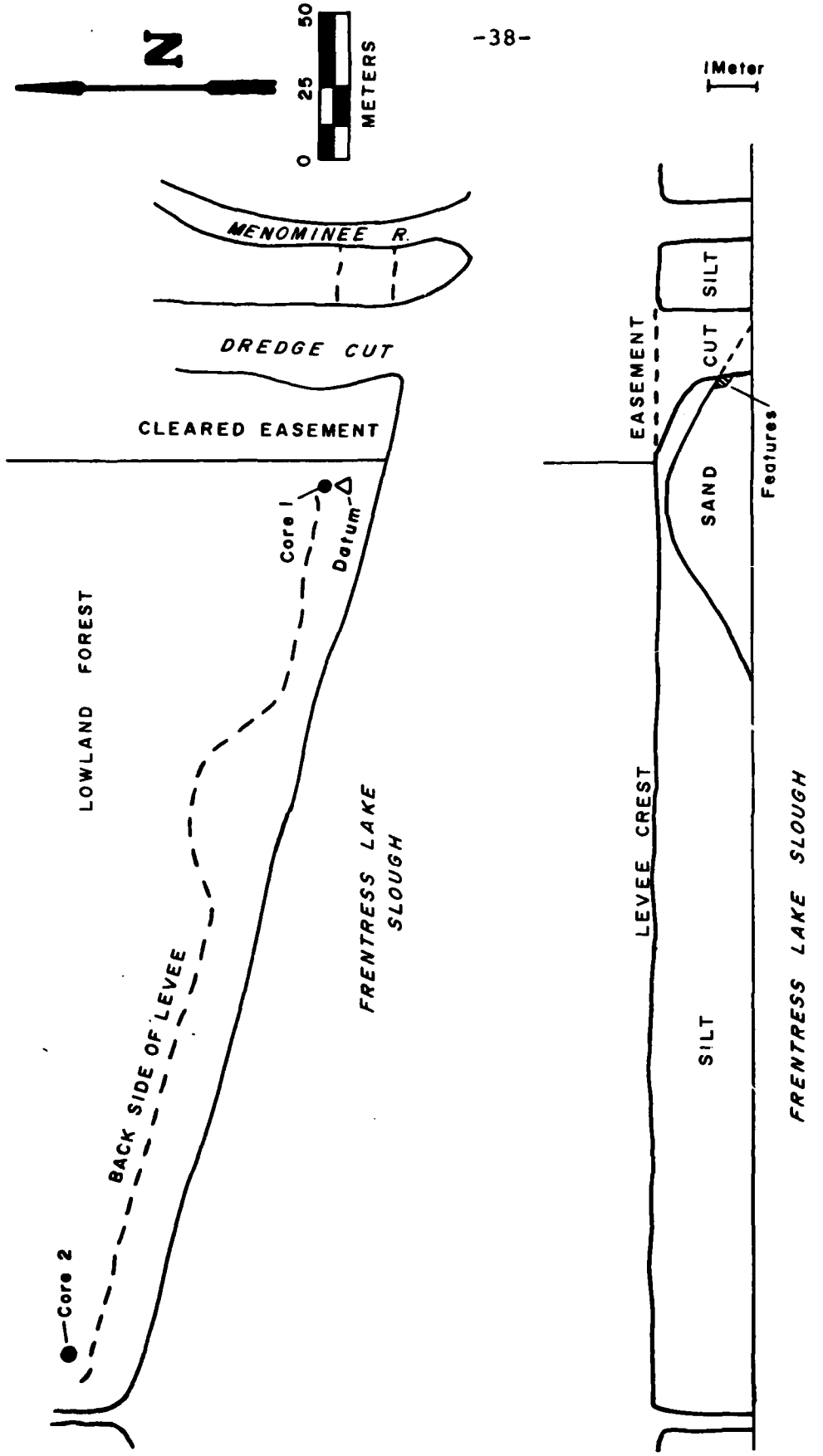


FIGURE 12: Profile of Eroding Levee Bank Along Frentress Lake Slough

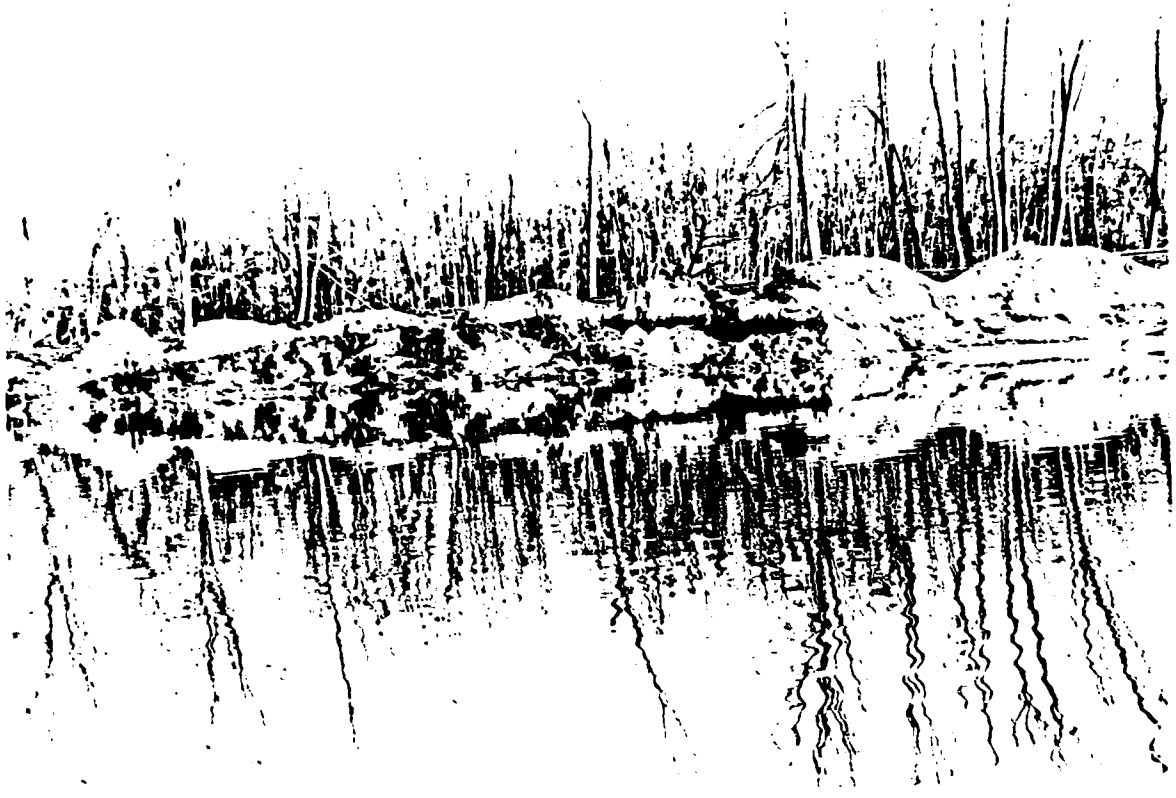


FIGURE 13: Levee Cross-Section East Side of Dredge Cut Channel

DREDGE CUT SLUMPAGE

Materials were also recovered from redeposited contexts while cleaning the dredge cut bank. These materials had slumped from vertical *in situ* positions following dredging operations, and were situated on a narrow foreshore along the dredge cut channel which was exposed during the low water stage (Figure 14). As noted above, the top 30-40cm of the dredge cut bank consisted of a relatively uniform silt horizon, although possibly as much as .5-1 meter of surface soils may have been removed during clearing of the easement. Below the silts is a pure sand horizon. Slumpage along the dredge cut foreshore consisted primarily of redeposited silt deposits.

Although the materials collected from the dredge cut slump had been disturbed from their original vertical contexts, the horizontal position is assumed to be close to the original provenience. Therefore, the materials recovered along this foreshore were provenienced by general horizontal location between the features recognized in the dredge cut profile. These features will be discussed in detail below. For convenience, Figure 15 is presented here which shows the location of the features along the dredge cut bank.

Table 3 lists the artifactual materials recovered from the slump along the dredge cut bank. The materials were located between Feature 1 to the north and Feature 3 to the south (a distance of 14 meters). No artifacts were observed outside of this length of bank. The artifacts include several diagnostic ceramic sherds. Between Features 1 and 2 (8N-4N on the site grid) three partially eroded ceramic sherd recovered which indicate Middle and Late Woodland components. The Middle Woodland occupation is represented by a single thin limestone tempered body sherd (3mm thick) which has a trailed line placed over a smooth surface. This sherd is similar to, and may

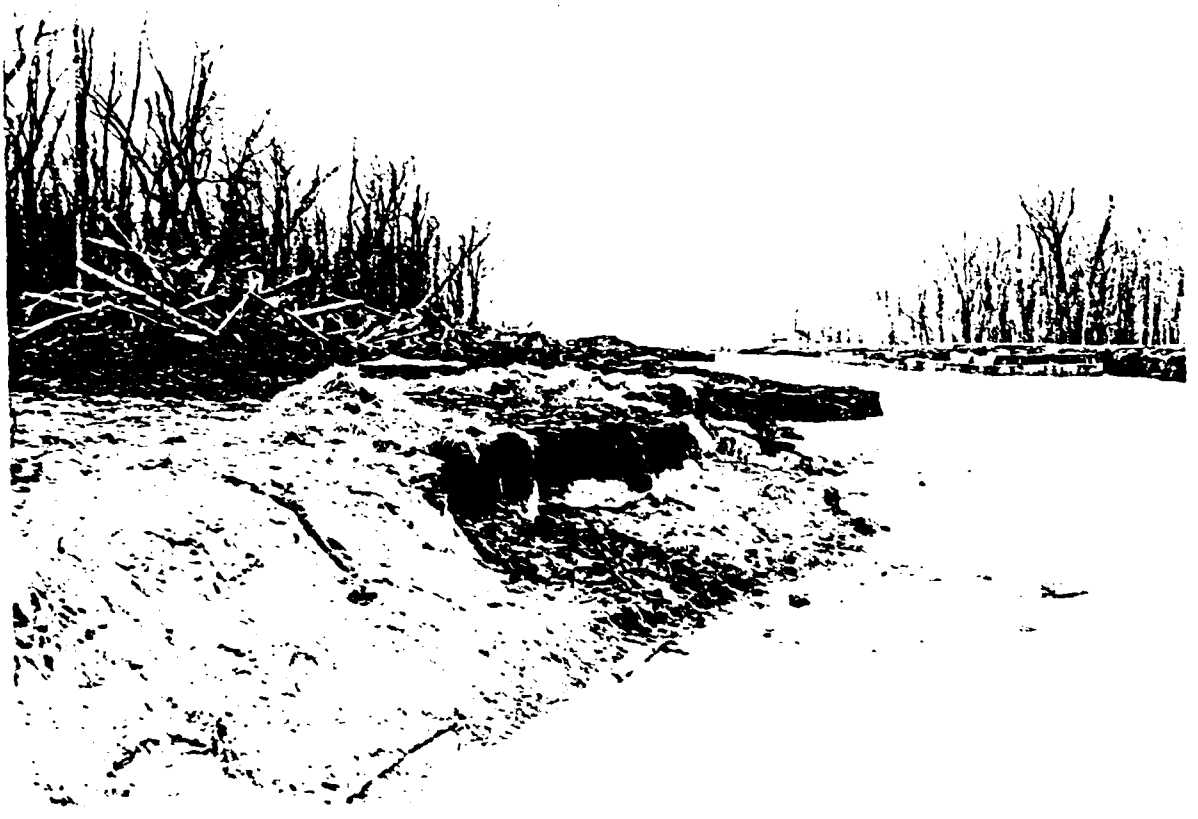


FIGURE 14: Dredge Cut Bank West Side of Channel

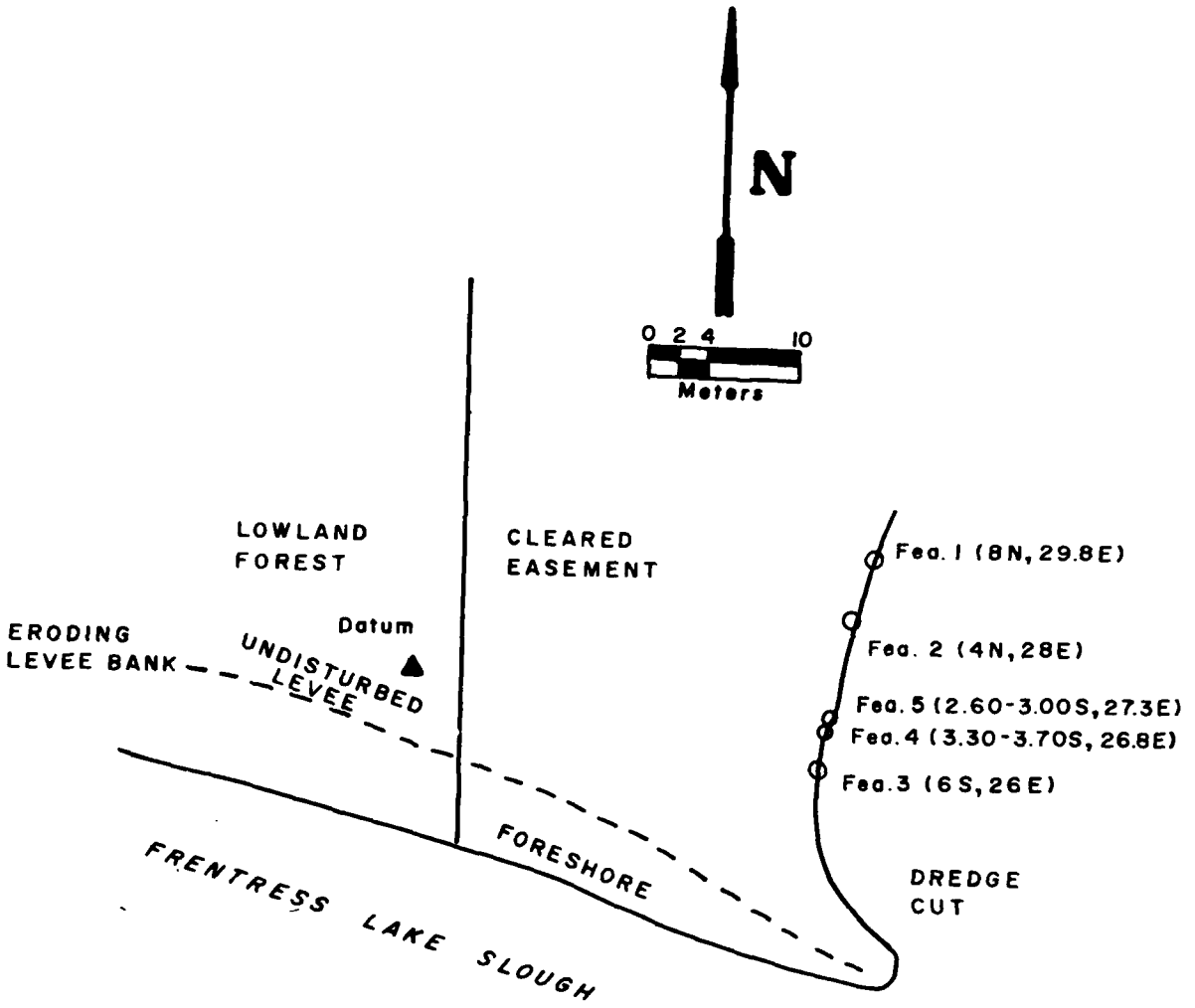


FIGURE 15: 11Jd126 Easement Area with Features Plotted Along Dredge Cut Bank

TABLE 3

Dredge Cut Slumpage

LITHICS

Cores (3)
Unretouched Flakes (5)

CERAMICS

Decorated Body-grit tempered (1)
Decorated Body-limestone tempered (1)
Decorated Body-grog tempered (1)
Undecorated Body-grit tempered (4: 1 cordmarked, 1 smoothed-over cordmarked, 2 exfoliated)
Undecorated Body-grog tempered (2 exfoliated)

ORGANIC

Shell Hinge (1)

HISTORIC

Flower Pot Rim (1)

Easement Dredge Cut Scrapings Between Features 4 and 3 - 3.5S-6S

LITHICS

Biface (1 fragment)
Unretouched Flakes (7: 2 shatter)

CERAMICS

Decorated Body-grit tempered (3)
Undecorated Body-grit tempered (1 smooth)
Undecorated Body-sand tempered (1 cordmarked)
Undecorated Body-grog tempered (1 exfoliated)

Dredge Cut Scrapings Feature 5/2 4N-2.5S

LITHICS

Unretouched Flakes (1)

CERAMICS

Undecorated Body-grit tempered (1 smoothed-over cordmarked)

represent the same vessel as, a sherd recovered in the ceramic concentration near Feature 2. Typologically, these two sherds appear to conform to the description of Hopewell Zoned Stamped (Griffin 1952:116). The second decorated sherd is tempered with sand and grog, and is 6mm thick. The decoration consists of either a horizontal dentate stamp or a cord impression placed over a vertical cordmarked surface. If the decoration was applied with a dentated stamp tool, the sherd would also indicate a Middle Woodland component. Several Middle Woodland ceramic types are partially defined on the basis of dentate stamping as a decoration including Naples Stamped variety dentate (Griffin 1952:110) and Levsen Stamped variety dentate (Logan 1976:93-94). However, dentate stamping on a cordmarked surface is not described in the definitions of these types. It is more likely that the sherd is decorated with a cord impression indicating a Late Woodland affiliation. The third decorated sherd is also partially eroded, and has a cord impression. This sherd is from the neck area of a vessel. The interior has exfoliated away precluding thickness measurement. The sherd is grit tempered. The decoration implies a Late Woodland component affiliation of the vessel from which this sherd originated.

Between Features 2 and 5 (4N-2.5S) along the dredge cut bank, no diagnostic artifacts were recovered from the slumped soils. In fact, the slumped soils from this area of the bank yielded a paucity of artifactual materials. Between Features 5 and 4 (3S-3.3S) no artifacts were recovered. From Feature 4 to Feature 3 (3.7-6S) several artifacts were recovered. These include three Late Woodland cord impressed, grit tempered body sherds. These sherds are partially eroded and two are exfoliated so that the interior surface is missing. The single nonexfoliated sherd is 3mm thick. Paste similarities between these sherds suggest that they may have originated from a single Late Woodland vessel, although they do not articulate with one another.

As mentioned earlier, materials were not recovered to the north of Feature 1 or to the south of Feature 3 in the slumped soils along the dredge cut bank. To the north of Feature 1, the lower sand horizon tapers for 8 meters until it dipped below the water level at the time of the testing. This corresponds to the northern extent of cultural deposits at this edge of the site. To the south of Feature 3, the sand horizon rises rather abruptly and is exposed at the surface of the cleared easement. As noted earlier, the cultural materials recovered from the dredge cut slump appeared to have originated from the upper silt horizon. The absence of cultural materials along the dredge cut to the south of Feature 3 is probably a reflection of the removal of the upper silt soils from this section of the easement. The materials recovered from the shoreline of Frentress Lake Slough to the south of Feature 3 argue that the cultural deposits originally extended at least to the present shore of the slough (or 10 meters south of Feature 3). Thus, the north-south extent of the cultural deposits at 11Jd126, as measured along the dredge cut bank, is approximately 30 meters beginning at the shore of Frentress Lake Slough.

DREDGE CUT PROFILE

Upon removal of the slumped soils along the dredge cut, efforts were turned to cleaning the profile wall. This was undertaken with the hopes of determining possible cultural or natural stratigraphy based on soil changes of diagnostic materials remaining *in situ* where relative depths might be compared, and any features in addition to the deep pit observed on November 9, 1981.

Component stratigraphic separation was not possible from the few materials recovered from nondisturbed contexts while cleaning the dredge cut profile. These materials were all nondiagnostic lithic debris and a few undecorated body sherds.

Unfortunately, little, if any, of the shell lens recognized in the east-west dredge cut bank on September 20, 1981 remained in the north-south dredge cut bank at the time of the testing. A few shell fragments were plotted *in situ* at grid point 26E,5S and at depths of 10-15 centimeters below the cleared easement surface. This area is 1.5 meters north of the location where the lower sand horizon is exposed on the cleared surface. Comparison of this location to the photograph of the shell lens on September 20, 1981 (see Figure 2), indicates the shell had been located at this area prior to continued dredging, suggesting that the shell fragments observed in the dredge cut profile at 5-6S probably represents the west edge of the former shell midden.

FEATURES

Following removal of the slumped soils along the dredge cut, several stains were observed intruding from the relatively uniform base of the dark upper silt horizon and into the lower light sand horizon. One of these had been recognized during the visit to the site on November 9, 1981. The anomalous appearance of these stains suggested that they might represent cultural features such as prehistoric storage and/or refuse pits. Careful cleaning of the dredge cut profile showed five stains, each of which was distinct in size or content character. These were designated Features 1 through 5 (Figure 16).

Features 1-3 seemed to actually intrude into the sand from the upper silt horizon. Unfortunately, the darkness of the upper soil made recognition of the tops or origins of these features nearly impossible. Feature 4 appeared as a very dark basin shaped stain observable within the dark silt horizon. Feature 5 was unique in appearing to have been separated from the base of the silt horizon by a layer of sand. At least partial excavation was attempted at Features 1, 2, 3 and 5. Individual descriptions of the features and their contents follows.

FEATURE 1

This feature designation was made for the deep dark stain observed in the dredge cut bank on November 9, 1981. This intrusive stain was located at 8N,29.8E on the site grid and protruded from the dredge cut bank ca. 50cm. By the time testing had begun, the feature had begun to erode severely, with a large amount of slumped soils located on the foreshore directly in front of the stain (Figure 17). This slumped soil was collected as soil sample bags and returned to the laboratory to be processed. These soils were water screened with all materials from the #20 mesh standard geological mesh saved. Table 4 lists the wide variety of materials recovered from the slumped soils in front of Feature 1.

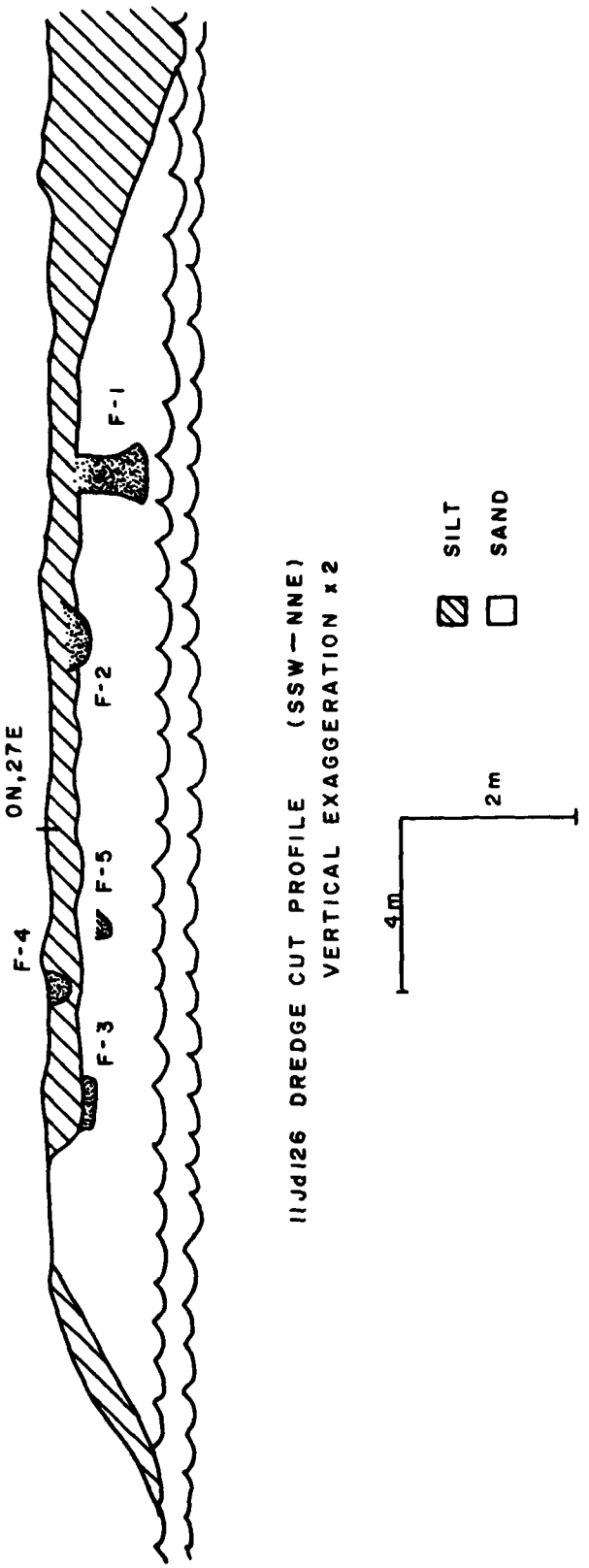


FIGURE 16: Dredge Cut Profile with Features Plotted

FIGURE 17: Feature 1 Prior to Excavation

TABLE 4

Feature 1 Slumpage

LITHICS

Unretouched Flakes (8)
Fire-cracked rock (4 burned limestone)
Unmodified rock (5: 3 pebbles, 2 limestone)

CERAMICS

Rim Sherds-grit tempered (1 knot impressed)
Rim Sherds-limestone tempered (1)
Decorated Body-grit tempered (1)
Undecorated Body-grit tempered (2: 1 smoothed over cordmarked, 1 exfoliated)
Undecorated Body-limestone tempered (4: 1 cordmarked, 3 smoothed-over cordmarked

ORGANIC

Burned and unburned bone and charcoal (1 vile)

HISTORIC

Bottle Fragment (1)
Metal (3 rusted pieces)
Concrete Fragment (1)

In addition to the historic artifacts, several decorated ceramic sherds were recovered which suggest a Late Woodland affiliation. These include one tiny rim sherd fragment with cord twist impressions on the outer lip. This sherd is grit tempered and is 3mm thick. A second decorated sherd has horizontal rows of cord impressions and vertical cord twists placed over a cordmarked surface (Figure 18a). This sherd is 4.5mm thick and is limestone and grit tempered. The third decorated sherd is unique. This sherd is extremely thin (2-3mm), grit tempered and over a finely cord roughened exterior surface are remnants of two shallow trailed lines (Figure 18b). The extreme thinness and paste of this sherd argue for Late Woodland affiliation. However, Late Woodland types for the upper midwest do not include trailing as a decorative element. Therefore, component recognition of this sherd is not as yet possible.

The nondecorated ceramic sherds are similar in paste, thickness and surface treatment as the three decorated sherds with one notable exception. This latter sherd is limestone tempered and cord roughened. However, it is 9mm thick and very probably did not originate from any of the vessels from which all other sherds recovered in Feature 1 slump came. Of course, the disturbed contexts of the materials from the slumpage on the foreshore of the dredge cut does not allow direct association to the feature. Figure 19 depicts Feature 1 following removal of the disturbed slump soils.

Feature 1 was profiled and mapped by cleaning a vertical face on a north-south axis (Figure 20). Several zones of slight soil banding were observed in the cleaned profile face which were mapped along with the depth and width of the stain (Figure 21). Unfortunately, the sides of the feature had been subject to erosion, precluding accurate measurement of the width.

It was apparent that the Feature had been capped with disturbed soils and limestone rock from historic occupation at the site. Historic structures are recorded in this area on the Rock Island District Corps of Engineers Contour maps made shortly before construction of Lock and Dam #12 (1930's).

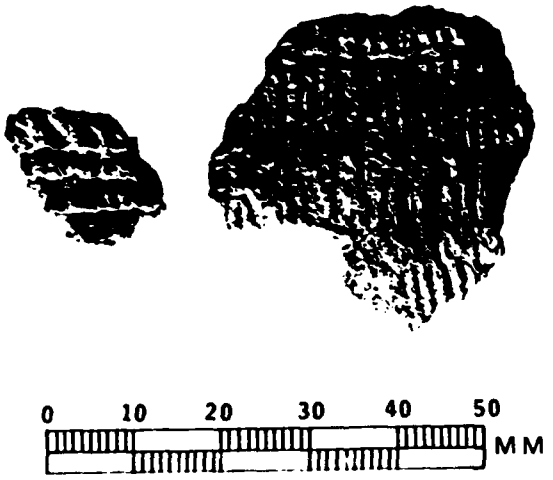


FIGURE 18: Artifacts from Feature 1 Slumpage

FIGURE 19: Feature 1 Beginning of Excavation

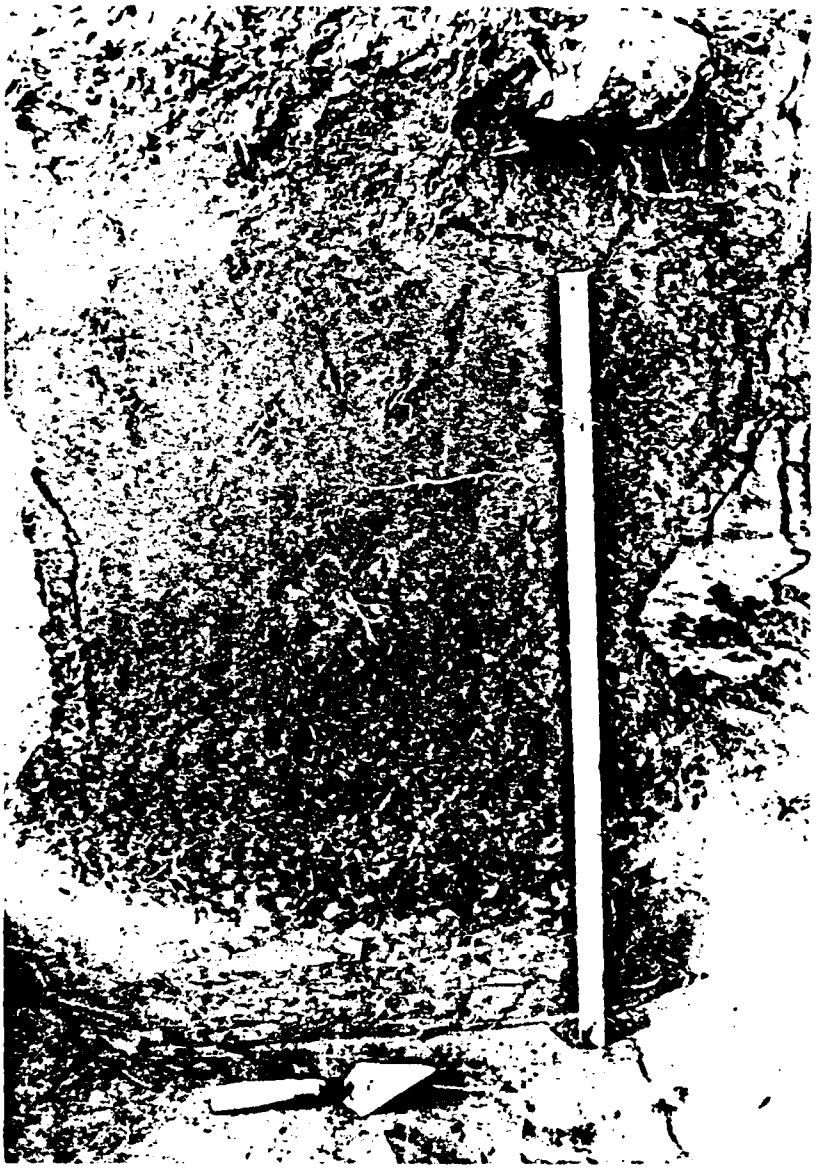
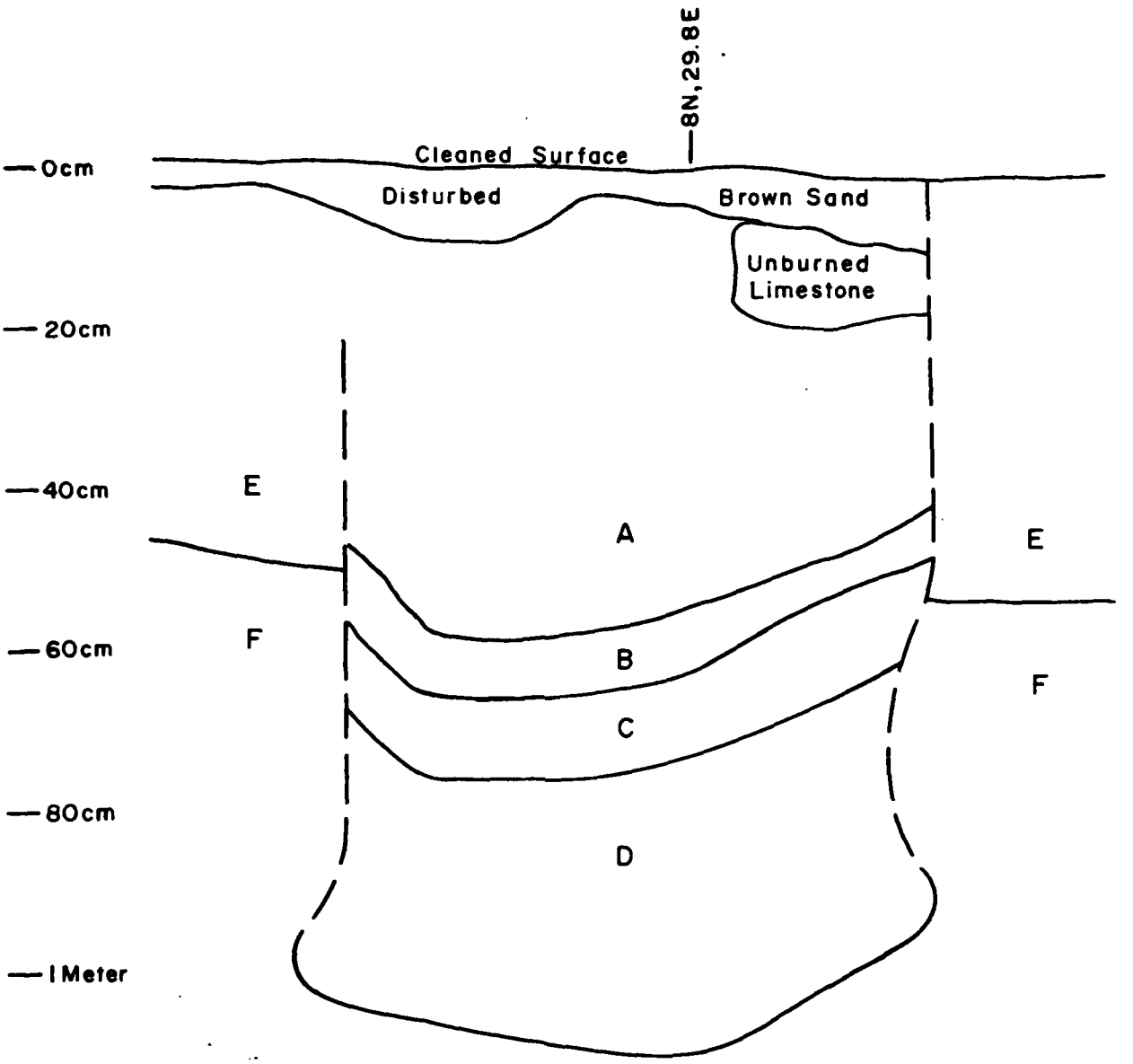


FIGURE 20: Feature 1 Profile



FEATURE 1 PROFILE FACING WEST 11-Jd-126

A- Uniform Dark Brown Silty Loam
B- Mottled Brown Sand - Black Silty Loam
C- Dark Organic Silt
D- Mottled Dark Brown with Gray Silt - Sand
E- Dark Brown Silt - Village Midden
F- Light Sterile Sands
Dashed lines indicate eroded walls of the feature. A-D protrude 30cm from E-F (E-F is 30cm west of A-D).

FIGURE 21: Feature 1 Profile

Further excavation of Feature 1 was postponed due to a period of wet and freezing weather, during which time protective straw and plastic insulation was placed over the feature. By the time conditions for testing improved, the protruding feature had detatched from the dredge cut bank and dropped about 30 cm. from its original position. While remaining intact, for the most part, the detachment had disturbed the protective casing. This exposed the feature to freezing. A cortex of frozen soil ca. 10 cm. thick encased the remaining feature during further excavation, which vastly limited controlled recovery.

However, a soil column was cut into the detatched feature removing soils in 10 cm. levels, and attempting to separate samples by the zones recognized in the cleaned profile. The soil samples were returned to the laboratory and 10 cups of each were processed by flotation. Heavy fraction materials greater than #20 standard geological screen mesh were saved and sorted under a 10 power stereoscopic microscope. Light fraction materials greater than #40 standard geological screen mesh were also saved and sorted under the microscope. Floral remains, such as seeds and charcoal, were sorted from the light fraction and have been submitted to Constance Arzigian of the University of Wisconsin-Madison Department of Anthropology for analysis. The results of her analysis accompany this report as Appendix A.

As noted earlier, a basic problem with the features identified in the dredge cut bank is recognition of the fill origins in the upper silt horizons of the easement. This could not be detected at Feature 1 because the color and texture of the A Zone was virtually indistinguishable from the silt horizons on either side. Therefore, comparison of the finds from the soil column may allow determination of whether the A Zone depicted in the feature profile is actual feature fill or prehistoric midden conforming to the silt horizon along the dredge cut bank to the south. Table 5 lists the quantities and kinds of materials recovered in the heavy fraction of the soil column sample. This

TABLE 5

FLOTATION SAMPLES: HEAVY FRACTION INVENTORY

Feature 1 (All zones - 10 cups)

Zone A: 9-20 centimeters below surface
4 Flakes, 1 Sherd (grit), 16 Burned Bone, 6 Charcoal

Zone A: 20-30 cm. b.s.
8 Flakes, 1 Chert Shatter, 4 Sherds, 15 Charcoal,
1 Uncharred Seed, 2 Quartz Shatter.

Zone A: 30-41 cm. b.s.
5 Flakes, est. 60 Burned Bone, 1 Uncharred Seed,
1 Rusted Metal Piece (?)

Zone B: 40-55 cm. b.s.
3 Flakes, 10 Sherds (limestone), 5 Charcoal

Zone C: 50-60 cm. b.s.
2 Flakes, 6 Sherds (limestone and grit), 4 Charcoal

Zone C: 60-70 cm. b.s.
2 Flakes, 2 Sherds (grit), 2 Burned Bone, 15 Charcoal

Zone D: 70-80 cm. b.s.
1 Flake, 1 Sherd (grit), 1 Burned Bone, 4 Charcoal

Zone D: 80-85 cm. b.s.
6 Flakes, 1 Sherd, 8 Charcoal

Zone D: 70-Bottom
5 Flakes, 6 Sherds (grit), 5 Bone, 25 Charcoal,
2 Uncharred Seeds

table indicates a significant change in quantities of charred bone and ceramics between Zone A and Zones C-D suggesting the fill at Zone A is different from lower feature fill. The results of the light function analysis substantiate the fill differences between Zone A and Zones B-D. These results of the flotation indicate that Zone A may be disturbed or may represent differential fill associated with the pit or habitation midden post dating the feature. Unfortunately, samples were not collected from the silt horizon of the dredge cut to the north and south of Feature 1 for comparison. Following removal of the Feature 1 soil column, an attempt was made to excavate the remaining fill by zones identified in the profile. This was extremely difficult due to the frozen exterior of the dislodged pit. However, several artifacts were recovered (Table 6). Of these, the few ceramic sherds have characteristics suggesting a Late Woodland component affiliation of this feature.

These undecorated sherds were recovered from the fill of Feature 1. From Zone A (not necessarily associated with the feature) a partially smoothed over cordmarked grit tempered sherd was recovered. This sherd is 2mm thick. Zone C produced a cordmarked grit tempered body sherd which is 3mm thick. A single limestone and grit tempered sherd was collected from Zone D. This latter sherd is 5-6mm thick, and the exterior surface is smoothed over cordmarked. The sherds from Zones A and C are suggestively Late Woodland because of the paste and extreme thinness. The sherd from Zone D is rather anomalous in terms of component affiliation. This sherd may represent either a Middle or Late Woodland component. Given the Late Woodland sherd recovered in Zone C, and the several possible Late Woodland sherds recovered from the slump in front of Feature 1, this pit is interpreted as representing a Late Woodland refuse pit. Refuse consisted of lithic debitage, ceramic sherds, and fragments of organic floral and faunal material.

TABLE 6

Feature 1 Excavation

(ZoneA)

LITHICS

Unretouched Flakes (4: 1 shatter)

CERAMICS

Undecorated Body-grit tempered (3: 1 cordmarked, 2 exfoliated)

(Zone B)

LITHICS

Unretouched Flakes (1 shatter)

(Zone C)

CERAMICS

Undecorated Body-grit tempered (1 cordmarked)

(Zone D)

LITHICS

Unretouched Flakes (2: 1 shatter)

CERAMICS

Undecorated Body-grit tempered (1 smoothed-over cordmarked)

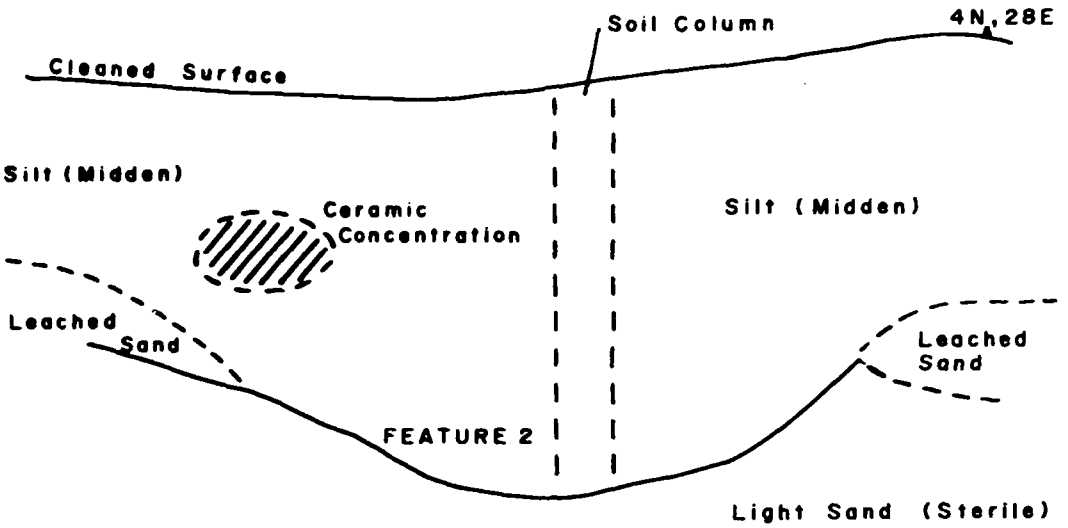
FEATURE 2

Feature 2 was located at grid point 4N,28E in the dredge cut profile. This feature was observed as a basin shaped dark stain intruding 15 cm. below the base of the upper silt horizon. The origin of this stain was not visually detectable within the silt.

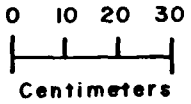
Excavation of Feature 2 began by clearing a north-south profile which was mapped and photographed (Figures 22 and 23). A vertical soil column was excavated through the center of this stain from the cleared easement surface to the sand horizon beneath. Soil samples were collected for each 10 cm. level. Ten cups of soil from each of these samples were floted and heavy and light fraction materials sorted under microscope. The light fraction materials have been analyzed by Constance Arzigian of the University of Wisconsin-Madison Laboratory of Archaeology (See Appendix A for Results of Floral Analysis).

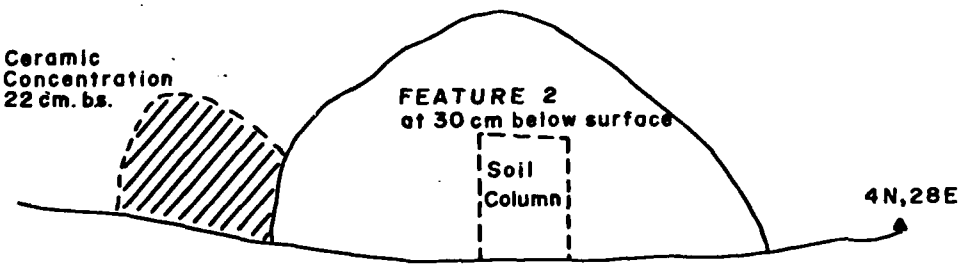
As noted above, the origin of Feature 2 was not observed in the dark silt horizon which contains evidence of habitation midden along the dredge cut. The materials listed in Table 7 are those recovered in the heavy fraction of the soil samples from this feature (greater than #20 mesh). These give little definite information on whether the levels within the silt horizon were feature fill or midden. Samples below 50 cm. were within the stained area intruding below the silt, and should represent true feature fill. The samples above (40-50 cm.) contained some similar materials (e.g fossil fragments), but differed in paste of the tiny ceramic sherds. The sand and grit tempered sherds continued through the samples from 20-30 cm., indicating similar cultural deposition, be it feature fill or midden, from 20-50 cm. The uppermost samples (0-20 cm.) contained generally different materials suggesting a change in deposit.

From this column of materials, it would appear that Feature 2 may have been a shallow depression into the sand horizon with the lowest stained samples representing contemporary fill, or a feature dug through 30 cm. of silt and into the sand with the pit top originating 10-20 cm. below the cleared easement surface.



FEATURE 2 WEST WALL PROFILE





FEATURE 2 PLANVIEW

FIGURE 22: Feature 2 Profile and Plan View

FIGURE 23: Feature 2 Profile

TABLE 7

FLOTATION SAMPLES: HEAVY FRACTION INVENTORY

Feature 2 (All samples 10 cups)

Sample 1: 0-10 Centimeters below surface

1 Flake, 5 Sherds (grit), 1 Glass Fragment, 1 Shingle Part, 1 Probable Concrete Fragment

Sample 2: 11-20 cm. b.s.

0 Flakes, 5 Sherds (1 limestone & grit) 12 Charcoal

Sample 3: 21-30 cm. b.s.

0 Flakes, est. 30 Sherds (grit & sand), 1 Charcoal

Sample 3: 21-30 cm. b.s. (2nd bag)

3 Flakes, 20 Sherds (grit & sand), est. 15 Charcoal

Sample 4: 31-40 cm. b.s.

5 Flakes, est. 60 Sherds (sand & grit), est. 15 Charcoal

Sample 5: 41-50 cm. b.s.

5 Flakes, est. 12 Sherds (grit & sand), 5 Charcoal, 5 Burned Bone, 7 Fossil Fragments

Sample 6: 51-60 cm. b.s.

2 Flakes, 4 Chert Shatter, 5 Sherds (grit), 1 Charcoal, 2 Fossil Fragments

Sample 7: 61-70 cm. b.s.

3 Flakes, 1 Chert Shatter, 1 Sherd (grit), 1 Burned Bone

The floral analysis results add little definite information about the origin of Feature 2. However, below 40 cm. the fill contained a lesser amount of unchanged seeds suggesting the possibility that the bottom of the feature might represent different filling than the upper 40 centimeters.

Excavation of Feature 2 continued by totally removing all soil above the stain. An area was excavated from the margins of the stained area to 50 cm. east of the dredge cut bank and feature profile. Levels were maintained in arbitrary 10 cm. vertical units. Materials recovered from these levels are listed in Table 8.

In levels 2 through 5, sand and grit tempered sherds were recovered. Level 4 contained grit tempered sherds. Many of these, and especially the sherd from level 5, are badly eroded, however, several of the sherds are not. A ceramic concentration was uncovered in level 3 (Figure 24). This concentration consisted of 11 sand and grit tempered cordmarked body sherds (7-8mm thick), (Figure 25a). These sherds appear to represent a portion of one vessel. In intimate association with these sherds was a single decorated limestone tempered sherd (4mm thick), (Figure 25b). This later sherd is zoned with an area of plain rock stamping separated from a smoothed, undecorated area by a curved incised line. This sherd is a good example of the Middle Woodland (McGregor/Trempealeau Phase) type Hopewell Zoned Stamped variety plain rocker (Griffin 1952:116). The association of this sherd with the undecorated cordmarked sherds implies that they represent the type Havana cordmarked (Griffin 1952:101-104). The sand and grit temper of these Havana cordmarked sherds is similar to the paste of several sherds recovered from other levels of Feature 2, suggesting a Middle Woodland (McGregor/Trempealeau Phase) component affiliation for this feature. This component designation is further argued for by the recovery in level 4 (below the silt horizon) of a single dentate stamped sherd. This later sherd is 4mm thick and contains sand and grit tempering.

TABLE 8

Feature 2 Excavation

(Level 1 0-10 cm. (Midden ?)

LITHICS
Retouched Flake (1)
Unretouched Flakes (9)
Fossilized Limestone (1)

CERAMICS
Undecorated Body-grit tempered (7: 1 cordmarked, 1 smooth, 5 exfoliated)

HISTORIC
Brown Glass Fragment (1)
Brick Fragment (1)

(Level 2)

LITHICS
Unretouched Flakes (4: 1 blade)

CERAMICS
Undecorated Body-sand tempered (4: 2 smoothed-over cordmarked 2 exfoliated)

ORGANIC
Charcoal (1 vile)

(Level 2: 20-25 cm. Ceramic Concentration)

CERAMICS
Decorated Body-limestone tempered (1)
Undecorated Body-grit/sand tempered (11 smoothed-over cordmarked)

(Level 3)

LITHICS
Unretouched Flakes (3)
Fire-cracked Rock (2 burned limestone)

CERAMIC
Undecorated Body-sand tempered (3: 2 cordmarked, 1 smooth)

(Level 4)

CERAMIC
Decorated Body-sand tempered (1)
Undecorated Body-sand tempered (1 exfoliated)
Undecorated Body-grit tempered (2: 1 cordmarked, 1 exfoliated)

(Level 5)

CERAMICS
Undecorated Body-sand tempered (1 exfoliated)

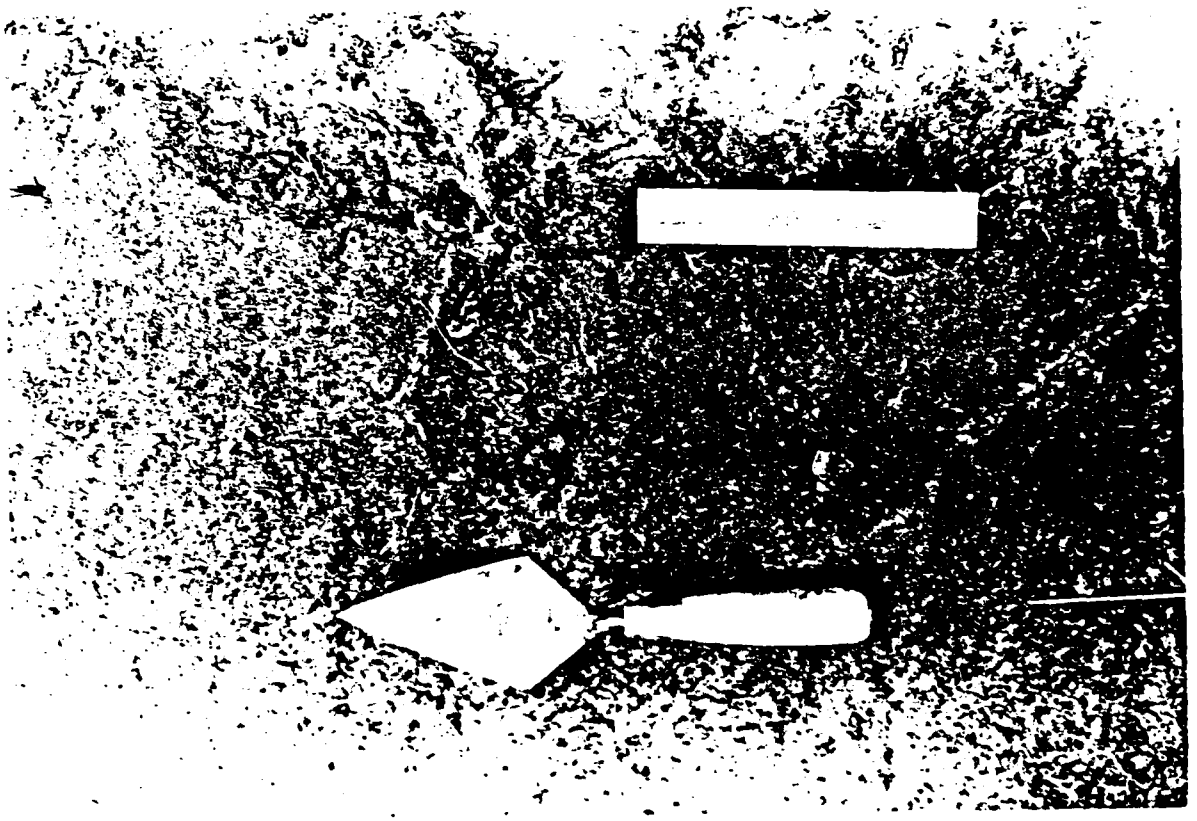


FIGURE 24: Ceramic Concentration at Feature 2

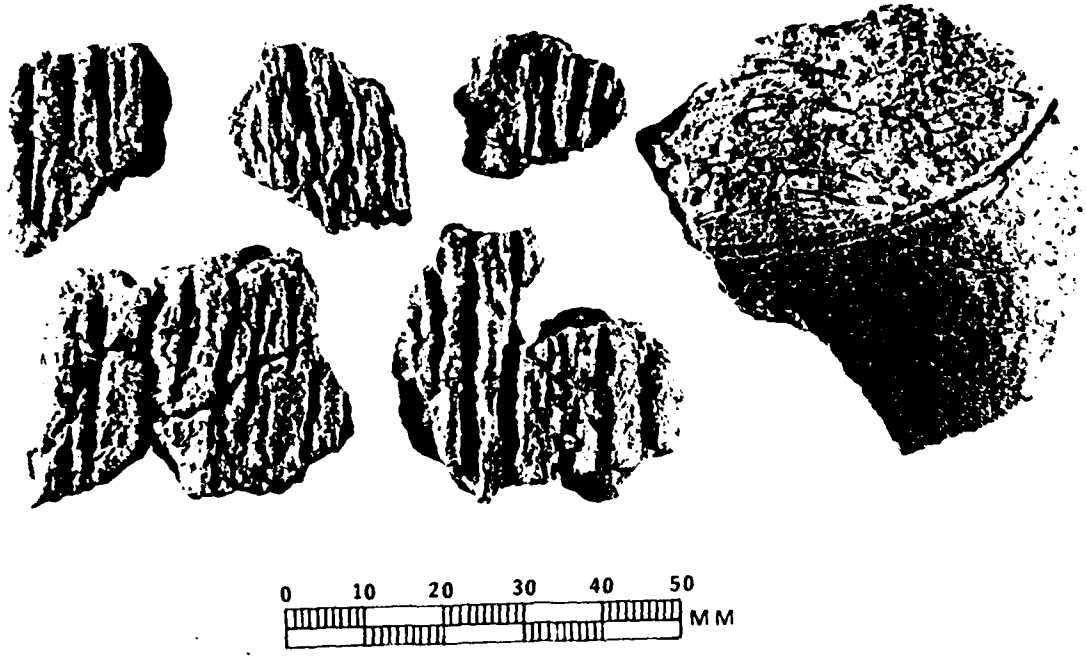


FIGURE 25: Sherds Recovered in Ceramic Concentration at Feature 2

Type affiliation of this sherd may be Hopewell Zoned Stamped variety dentate stamped (Griffin 1952:116), Naples Stamped Variety dentate (Griffin 1952:110), (both McGregor/Trempealeau Phase diagnostics) or Levsen Stamped variety dentate (Logan 1976), (an Allamakee/Millville Phase type). Given the earlier Middle Woodland affiliation of the ceramic concentration above, the dentate stamped sherd, it is suggested that the later sherd probably also represents a McGregor/Trempealeau Phase vessel and component.

In levels 4 and 5 of Feature 2, two grit tempered sherds were recovered which represent at least one different vessel from the sand and grit tempered sherds found throughout the feature. Only one of the grit tempered sherds has remnants of the exterior surface which is cordmarked. This sherd is 7mm thick. The cordage impression on the exterior of this sherd is much finer than those on the Havana cordmarked sherds from the ceramic concentration in level 3. Griffin's definition of Havana cordmarked acknowledges great variation in cordage size.

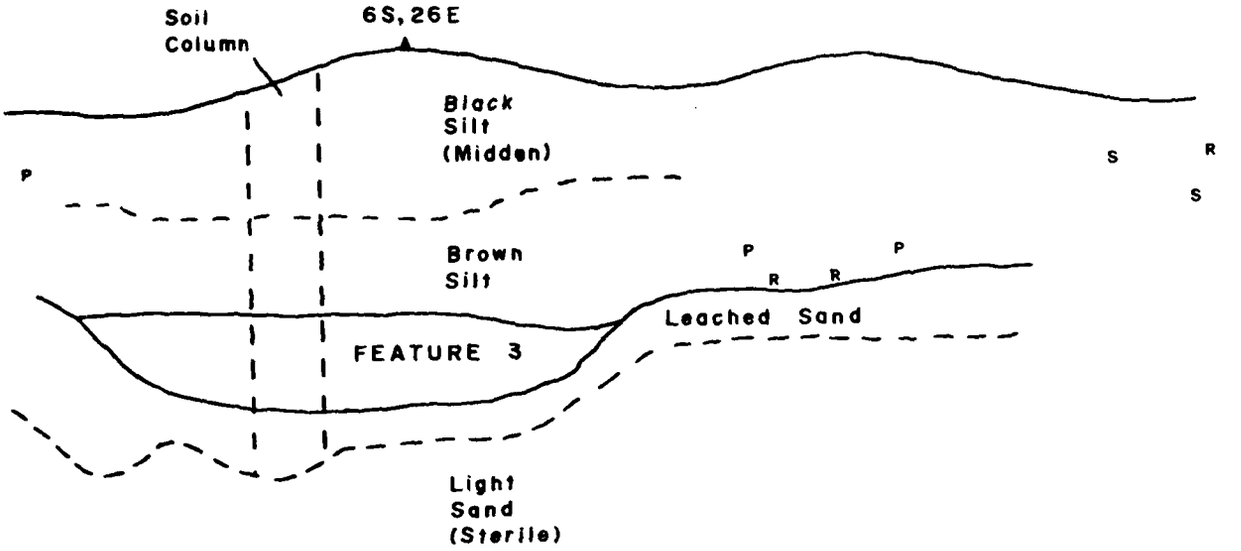
Other materials recovered in the fill of Feature 2 include lithic debitage and charred floral and a few charred faunal remains. Based on the materials recovered in the excavation of the Feature 2 soils, the stained area is interpreted as representing the base of a Middle Woodland (McGregor/Trempealeau Phase) refuse pit which originates in the upper silt horizon at a depth of ca. 10 cm. below the surface of the cleared easement. Within this feature was a concentration of ceramic sherds, including one with definite Hopewellian affinities. This concentration represents a single episode of dumping within the pit.

FEATURE 3

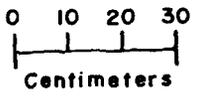
Feature 3 was located at grid point 6S,26E. This feature was observed as a darkened stain extending approximately 10 cm. below the base of the silt horizon and nearly 1 meter across in the dredge cut profile. Immediately to the south of this stain, the sand horizon is exposed on the surface of the cleared easement. At this vicinity, a feature like stain is visible in the photograph of the dredge cut taken on September 20, 1981 (see Figure 2). The stain in that photograph may represent Feature 3 at its initial exposure. By the time that testing had begun, the dredge had cut to the north leaving only the western portion of the stain designated Feature 3.

The dredge cut bank at Feature 3 was cleared with a trowel, and a generally north-south profile was mapped and photographed (Figures 26 and 27). As with Features 1 and 2, the upper origin of Feature 3 was difficult to discern from the upper silt horizon. However, the fill of the intrusive stain was fairly distinctive being composed of a large amount of charcoal flecks in a sandy soil matrix. Assuming the fill of the entire feature was uniform, it appeared that Feature 3 consisted of a burned shallow basin which lay entirely below the silt horizon, and originated at the base of the upper soil horizon at a depth of ca. 40 cm. below the cleared easement surface.

Feature 3 was excavated in a similar fashion as Feature 2. A vertical soil column was cut through the center of the stain from the surface of the cleared easement (Figure 28). Samples from this column were processed by flotation, and heavy and light fractions sorted under microscope. The light fraction materials have been analyzed by Constance Arzigian at the University of Wisconsin-Madison, and her findings are be incorporated in Appendix A. The heavy fraction materials per sample are listed in Table 9. Samples F and G were taken from depths corresponding to the charcoal stained sand at the base of the silt. As Table 9 indicates, these samples were void of heavy cultural materials (e.g. lithics and ceramics).



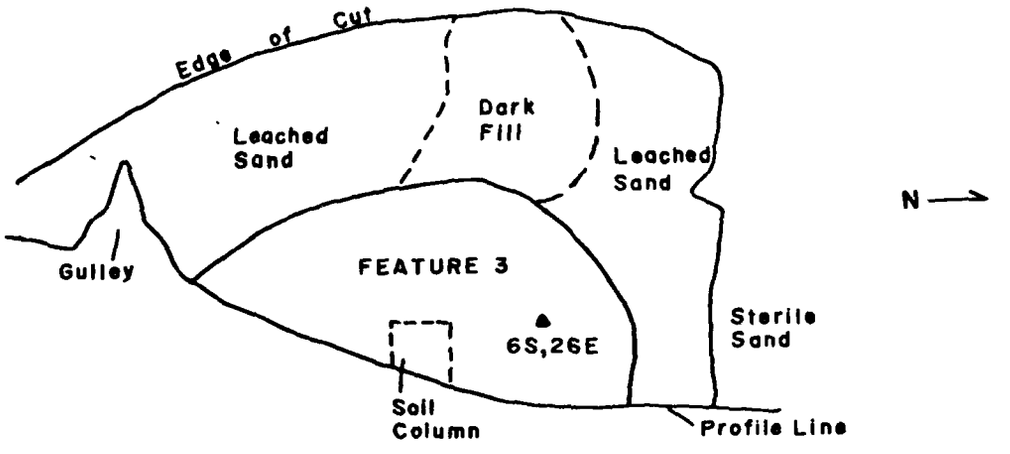
FEATURE 3 PROFILE WEST WALL



P - Ceramic Sherd

S - Shell

R - Fire Cracked Rock



FEATURE 3 PLANVIEW at 53cm below surface

FIGURE 26: Feature 3 Profile and Plan View

FIGURE 27: Feature 3 Profile

FIGURE 28: Feature 3 Profile Showing Soil Column

TABLE 9

FLOTATION SAMPLES: HEAVY FRACTION INVENTORY

Feature 3

Sample A: (3 cups)

2 Flakes, 2 Sherds (grit & sand), 2 Burned Bone, est. 20 Charcoal

Sample B: 20-30 cm. b.s. (3 cups)

0 Flakes, 4 Sherds (sand & grit), 1 Burned Bone, est. 20 Charcoal

Sample C: 20-25 cm. b.s. (2 cups)

1 Flake, 9 Sherds (sand & grit), 6 Charcoal

Sample D: 25-36 cm. b.s. (4 cups)

3 Flakes, 1 Sherd (sand), 10 Charcoal

Sample E: 36-46 cm. b.s. (4 cups)

0 Flakes, 1 Sherd (sand), 10 Charcoal, 1 Manganese Ball

Sample F: (3 cups)

Nothing

Sample G: (3 cups)

Nothing

NW-1/4 of Feature Bag #1 (10 cups)

3 Sherds (sand), 15 Charcoal

NW-1/4 of Feature Bag #2 (10 cups)

4 Sherds (sand), est. 25 Charcoal

The remainder of Feature 3 was revealed by opening a unit ca. 50 cm. E-W x ca. 150 cm. along the dredge cut and encompassing the stain. This unit was excavated in 10 cm. levels from the disturbed surface. Several diagnostic artifacts were recovered in the levels of the silt horizon above the feature stain. These include a grit tempered rim sherd (Figure 29). This sherd was located 27 cm. above the top of the feature stain. The lip of the rim is flattened and is 4mm thick. On the exterior rim, the surface had been cordmarked and slightly smoothed over to 23mm below the lip. Corresponding to this area of the rim is an outward bulge caused from mild interior channeling.

Below the channeled area, the neck constricts slightly and was smoothed to the shoulder creating a horizontal band ca. 22 cm. wide. Within the smoothed band is an irregular inscribed line which apparently encircled the vessel. Beginning at the outward bend of the shoulder, the surface is again smoothed over cordmarked. On the shoulder is an oblique column of semi-horizontal gashes. From the lip to the shoulder the vessel wall thickens to 6mm. The decoration of this rim sherd does not fit any type description found in the literature. However, the smoothing above the shoulder and the channeled rim are characteristic of Havana and Weaver ware types of Middle Woodland affiliation.

From 20-25 cm. above the feature several sherds which probably represent a single vessel were recovered. These sherds were distributed horizontally across and outside of the extent of feature stain. These sherds are tempered with crushed grit and contain a high percentage of sand in the paste. Sherd thicknesses are uniformly 5mm. Figure 30 illustrates one of the decorated sherds from this level of the silt horizon above Feature 3. This sherd has a series of parallel cord-wrap stick impressions on a smoothed surface.

At the opposite end of the sherd, and separated by an undecorated area 25mm across, are suggestions of another area of

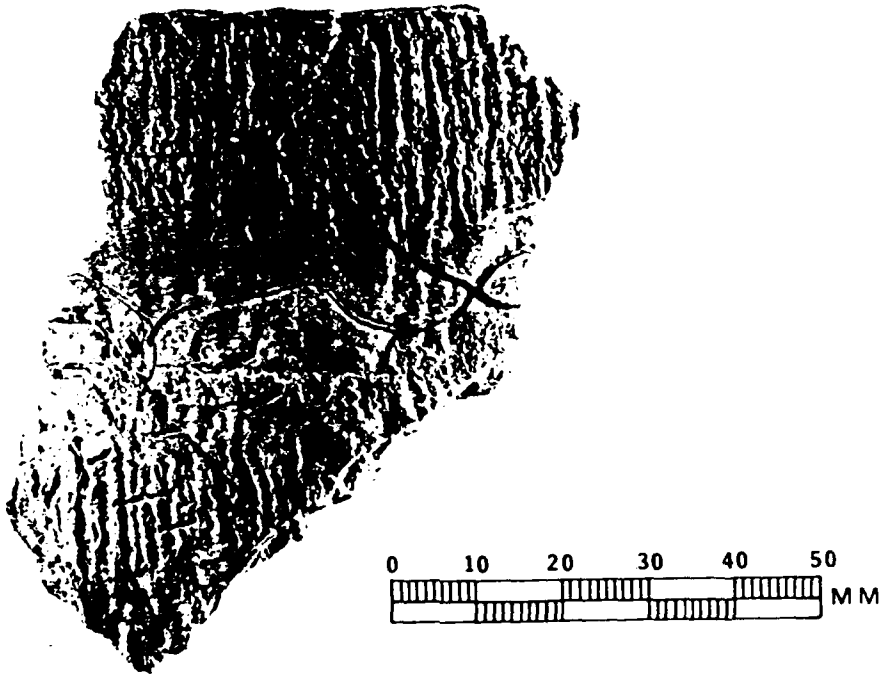


FIGURE 29: Rim Sherd Recovered from Midden Overlaying Feature 3

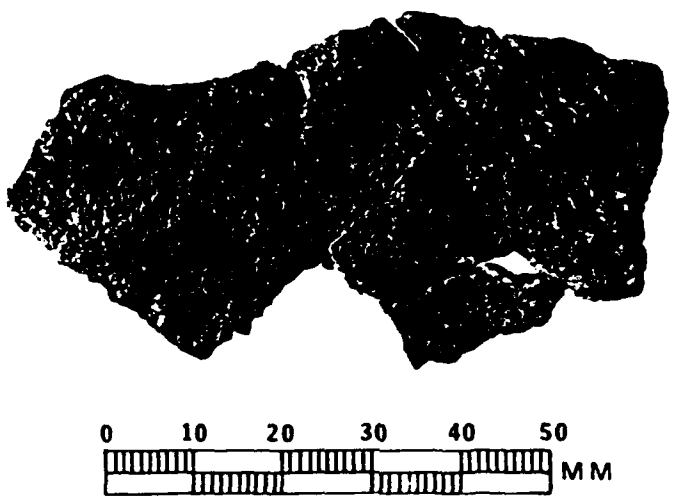


FIGURE 30: Decorated Body Sherd from Midden Overlaying Feature 3

similar decoration. This kind of decoration indicates Middle Woodland affinities, such as are reported for the types Naples Stamped variety cord-wrap stick (Griffin 1952:112), Kegonsa Stamped (Hurley 1974), or Hopewell Zoned Stamped variety cord-wrap stick (Griffin 1952:116), or later Middle Woodland types, such as Levsen Stamped variety cord-wrap stick (Logan 1976:93-94) or Weaver Plain variety cord-wrap stick (Griffin 1952:121-122).

Just to the north of the Feature 3 stain, and within the lowest levels of the silt horizon, a concentration of ceramic sherds was encountered. These sherds were found in a vertical range of 15 cm. The sherds appear to represent a single vessel, however, none are decorated. Paste includes sand, crushed grit and limestone temper. These sherds range in thickness from 6-9mm. Assignment of component affiliation of the sherds in this concentration is not attempted here, other than to note they occurred at lower levels than the previously described Middle Woodland sherds.

A list of all of the artifacts recovered during the excavation of levels within the upper silt horizon above Feature 3 is presented in Table 10. The variety and quantity of these materials suggests the silt horizon above Feature 3 contained habitation midden deposits of Middle Woodland age. Several shell fragments were observed in the profile, approximately 1 meter to the north of the Feature 3 stain, and 25-30 cm. above the top of this stain. These probably represent the extreme western edge of the shell midden that was photographed on September 20, 1981. Absolute component affiliation of the shell midden was not possible due to the near complete removal of the shell prior to the testing and lack of diagnostic artifacts found in association with the few remaing fragments near Feature 3. However, the Middle Woodland rim sherd found above Feature 3 corresponds closely to the relative vertical position of these shell fragments.

Upon reaching the base of the silt horizon, the outline of Feature 3 became visible in plain view (Figure 26). The

TABLE 10

Excavation Level 2 (Above Feature 3)

LITHICS
Unretouched Flakes (2)

CERAMICS
Decorated Body-grit tempered (2 cordmarked)

Excavation Level 3 (Above Feature 3)

LITHICS
Retouched Flakes (1)
Unretouched Flakes (1)
Hammerstone (1 fragment)
Fire-cracked Rock (4 burned limestone)

CERAMICS
Rims-grit tempered (1)

Excavation Level 3 (Above Feature 3)

LITHICS
Unretouched Flakes (3)

CERAMICS
Undecorated Body-grit tempered (15: 2 cordmarked, 1 smoothed, 1 exfoliated)

Excavation Level 4, Feature 3

LITHICS
Unretouched Flakes (2)
Fire-cracked Rock (2 burned limestone)

CERAMICS
Undecorated Body-grit (47: 20 smoothed-over cordmarked, 27 exfoliated)

Feature 3

MISCELLANEOUS
Charcoal (1 vial)

remaining portion of the charcoal filled stain was semi-circular. Excavation of the stain recovered only charcoal flecks. However, the north half of the stain (= NW 1/4 of the original feature) was removed and saved as soil sample to be flotated in the laboratory. A total of 20 cups of matrix from this sample were processed, and several tiny sand tempered sherd fragments found. (Table 9). No other artifactual materials were recovered from this sample.

Although no diagnostic artifacts were recovered in direct association with the Feature 3 stain, the presence of Middle Woodland ceramics above indicates that the feature did not represent a cultural activity later than the Middle Woodland component at the site. In summary, Feature 3 is interpreted to have been a fire hearth of pre-Middle Woodland or Middle Woodland age.

FEATURES 4 and 5

Two apparently unnatural stains were observed very near each other in the dredge cut profile and designated Features 4 and 5. Feature 4 showed as a black basin shaped stain at grid location 3.30-3.70S, 26.8E. The stain was contained within the silt horizon, but because of the exceptional darkness, the stain was detectable from the dark silt. Although the Feature 4 stain did not extend into the lower sand horizon, a depression of leached silt into the sand was observed just below the stain. No artifacts were noted in the stain of Feature 4 in the profile.

Feature 5 was located at 2.60-3.00, 27.3E on the grid. This feature was recognized as a distinct stain of alternating silt and dark sand lenses, which occurred well into the sand horizon and separated from the base of the silt horizon by ca. 25 cm. of leached sand. The depth of the Feature 5 stain and separation from the silt horizon made this feature unique from the others identified in the dredge cut profile.

Features 4 and 5 were recognized near the forced closure of the field operations due to inclement conditions. Because Feature 5 was situated within the loose sand horizon and was, therefore, in a more precarious situation, excavation was attempted. Feature 4 is in a relatively more stable horizon (i.e. the firm silt). Due to the lack of time, excavation of the Feature 4 stain was not attempted. Both features were cleaned and profiled (Figure 31).

Excavation of Feature 5 was undertaken near the close of field operations. The excavation was attempted, due to the high probability that the feature would be totally destroyed during the next period of high water. Time restrictions did not allow excavation from the surface of the cleared easement to the feature. Instead, the feature fill was removed from the wall of the profile collecting all of the matrix from the silt and sand lenses as soil samples to be processed in the laboratory. No artifacts were observed while removing the Feature 5 fill.

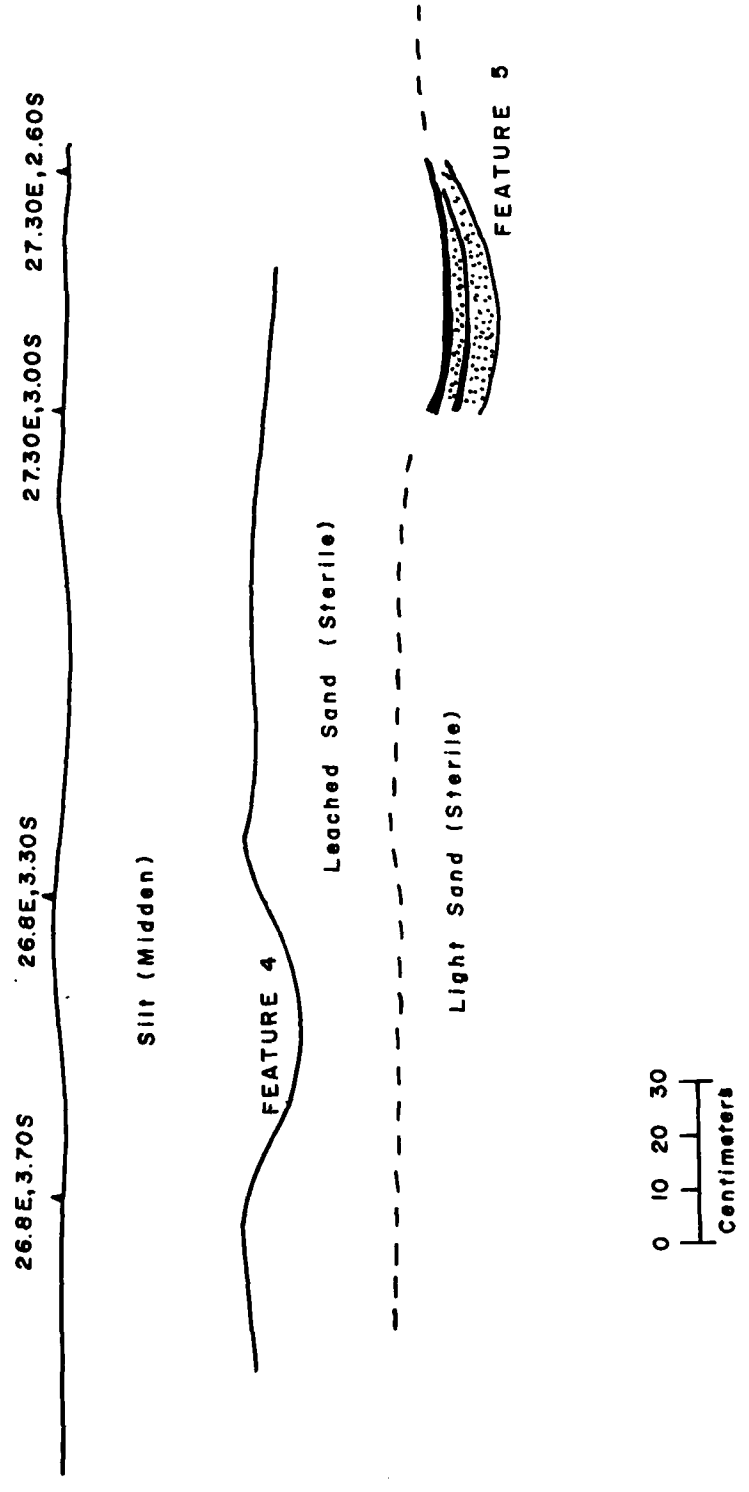


FIGURE 31: Features 4 and 5 Profile

A total of 6 cups of soil was collected and floted from the upper silt lens of the feature, and 13 cups from the sand lenses. Table 11 lists the materials recovered from the heavy fraction of these samples. These include eleven minute grit tempered sherds. Light fraction materials recovered from the flotation are presented in Appendix A. The light fraction contained many modern seeds, several of which showed indications of roden knawing. Although the ceramics suggest the Feature 5 stain may represent a prehistoric actiity, (and if so would, by its stratigraphic position, predate the components represented in the upper silt horizon at the site), the floral remains indicate that the stain is probably the result of rodent activity.

TABLE 11

Feature 5

Silt Lens:	60 cm. b.s. (6 cups)
	11 sherds (grit, 1 burned bone, 4 uncharred seeds, 1 Manganese Ball, 2 charcoal, 1 cinder (charred pine pitch ?)
Sand Lens:	62-70 cm. b.s. (13 cups)
	Nothing

DISCUSSION

Although the archaeological testing activities conducted at 11Jd126 during the late fall of 1981 were limited due to the extremely poor field conditions, a number of basic sets of information were obtained regarding the nature of the cultural deposits remaining at the site. The testing efforts were addressed to the goals outlined in the introduction of this report, and the results have been (1) to record the distribution of cultural materials from which it is believed an accurate estimation of the horizontal and vertical extent of the cultural deposits is possible, (2) to identify diagnostic artifacts from the site which are representative of at least two prehistoric components, (3) to discern several types of prehistoric activities, (4) to begin to identify the preserved environmental resources which are exploited by the prehistoric inhabitants, thereby allowing interpretation of the sites ecological setting, and (5) to gain a better understanding of the present condition of the site which, when compared against impending natural and cultural impacts, reveals a dim future.

Each of the above topics is discussed below.

Extent of Cultural Deposits at 11Jd126

The distribution of cultural materials recovered from the eroding levee bank along Frentress Lake Sough, from the surface of the cleared easement and along the dredge cut bank allows an accurate estimation of the horizontal extent of the cultural deposits at 11Jd126. The materials collected from the eroding levee bank and those from the slumped dredge cut bank are assumed to closely reflect their original horizontal positions. This assumption is based on the fact that cultural materials, such as lithic debitage and ceramic sherds, are heavier than silt and sand particles, and that the present current in Frentress Lake Slough is not strong enough to carry the artifacts. Thus,

cultural materials falling ouf of *in situ* contexts at exposed banks move vertically downward but are not transported laterally.

Surface collections during August and during the testing in November/December on the foreshore of Frentress Lake Sough documented the distribution of redeposited materials from the approximate location of the western boundary of the easement to the northwest for ca. 250 meters. From the western easement boundary to the southeast, the levee was not severely eroding and materials were not found on the foreshore of Frentress Lake Slough. However, at the time the shell midden was located (September 20, 1981), it became apparent that the cultural deposits extended another 50 meters to the southeast. Thus, the distribution of materials along the levee was originally 300 meters.

Measurements of the width of the cultural deposits were made possible by the clearing of the easement surface and the dredge cut to the north of Frentress Lake Slough. The materials collected from the easement surface may represent a biased distribution of the cultural deposits due to the use of heavy machinery in stripping the vegetation and surface soils. Artifacts collected from this surface were scattered from the western easement boundary to the dredge cut (25-30 meters east-west) and from the shore of Frentress Lake Slough to the north for 40 meters. Materials were recovered in the slumped bank soils along the dredge cut and traced in the dredge cut profile from Feature 3 to Feature 1 equalling a distance of 30 meters to the north of Frentress Lake Slough. This distribution corresponds closely to the width of the levee. The high portion of the levee to the northwest of the easement varies from approximately 10 meters wide at the extreme northwest end of the site to a width of 25-50 meters near the center of the site. Assuming the cultural deposits conform to the length and width of the levee crest, the horizontal dimensions of 11Jd126 were originally 300 meters NW-SE by 10-50 meters N-S, depending upon which section of the levee is considered. At the easement, the width is documented to be 30 meters.

The vertical extent of the cultural deposits at 11Jd126 were traced in the dredge cut profile. However, these depths were measured from a disturbed surface. The process of stripping the easement surface of vegetation prior to dredging, removed unknown amounts of soil but exposed cultural materials across the easement. The cleared surface dipped to the east from the western easement boundary suggesting the depth of removed surface soils was probably not uniform. On the other hand, the cultural deposits may not lay in horizontal planes in this area of the site and the depths of the cultural deposits at the dredge cut may not be consistent with other amounts of the site.

Along the dredge cut, the disturbed surface is estimated to be 50-75 cm. below the undisturbed surface at the western easement boundary (25-30 meters to the west). Assuming the original surface of the levee was originally relatively uniform, the elevation difference between the cleared easement surface and the undisturbed western boundary is probably a close approximation of the amount of soil removed. Cultural deposits were exposed on the disturbed easement surface at the dredge cut. However, it is not known how much of the removed upper soils contained cultural deposits. At the cleared surface along the dredge cut, *in situ* cultural deposits were contained throughout the upper silt horizon of which 30-40 cm. remained. Below the silt horizon lays a sand horizon which is culturally sterile excepting intrusive features.

To the west of the dredge cut, the lower sand horizon rises so that in the undisturbed portion of the levee at datum, the upper silts are only 30 cm. deep.

Assuming the lower sand horizon at datum is also culturally sterile, the cultural deposits at that section of the levee are suggestively compacted within a thinner silt horizon. This assumption is based on the interpretation of the principal prehistoric occupations as having occurred after the deposition of the sand. To the northwest of datum, where the lower sand horizon dips well below the levee surface and the levee cut bank

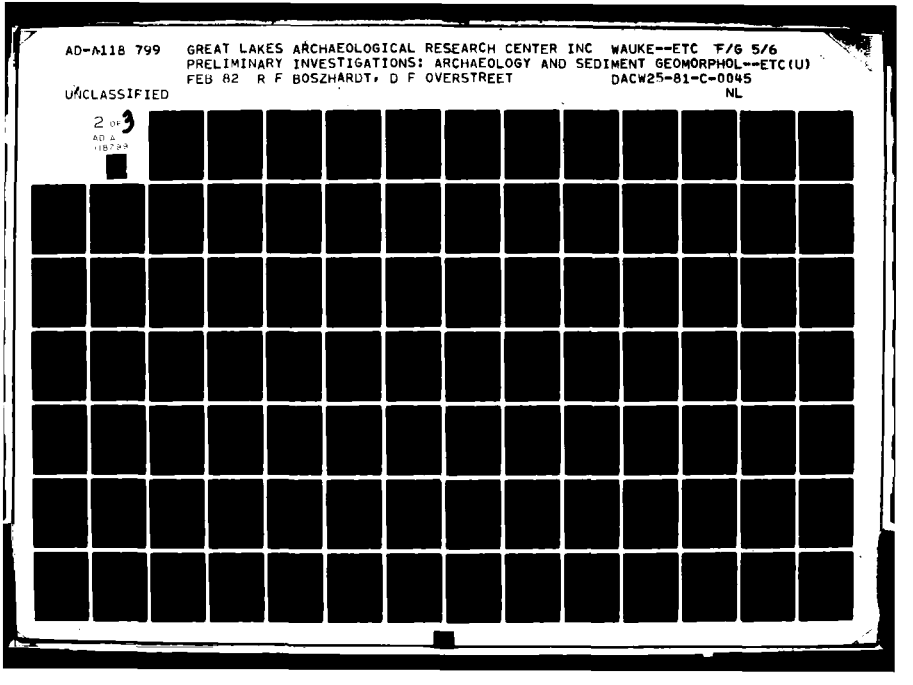
consists of a 2 meter high bank of silt only, the cultural deposits may be more vertically separated.

Cultural Components at 11Jd126

At least two prehistoric occupations, and possibly a third, have been identified from diagnostic artifacts recovered at the easement section of 11Jd126. An Early Woodland component is suggested from the base of a straight stemmed point which was recovered on the foreshore of Frentress Lake Slough just to the south of datum. Within the upper silt horizon of the drege cut profile, several Middle Woodland ceramic sherds were recovered in the fill of Feature 2. Finally, a Late Woodland component is documented from the recovery of diagnostic cord impressed ceramic sherds, although the only *in situ* Late Woodland deposit identified is Feature 1.

The straight stemmed point base is typologically similar to Kramer/Liverpool Stemmed points which have been affiliated with Early Woodland occupations. Early Woodland assemblages with straight stemmed points often contain Marion Thick Ceramics in the upper midwest. Radiocarbon dates for Marion sites appear to cluster between 500-550 B.C. (Munson 1966, 1981, Streuver 1968).

Within the ceramic concentration adjacent to or with the fill of Feature 2, was a sherd which has obvious Hopewellian affinities. The age of Hopewell in the central Illinois valley has been placed between 200 B.C. A.D. and 400, with Cantwell (1980) indicating Hopewellian Ogden Phase as occurring after A.D. 150. In southwestern Wisconsin, Hopewell related occupations have been used to identify the Trempealeau Phase, which Stoltman (1979) dates from 100 B.C. to A.D. 300. The corresponding McGregor Phase in northeastern Iowa is chronologically placed between a.D. 0 - A.D. 300 (Benn 1979). While the Middle Woodland sherds recovered above Featre 3 may represent a later Middle Woodland occupation, there is little reason to doubt their probable contemporarity with the Hopewell component. The Middle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Woodland occupation at the easement portion of 11Jd126 occurred during the initial stage of silt deposition over the sand. The Middle Woodland diagnostic artifacts in the silt horizon above Feature 3 were recovered within a vertical range of 20-30 cm. This may reflect relatively rapid soil deposition, such as might have occurred during the spring of the year corresponding to the period of snow cover melting in the upper portion of the drainage basin. If this is accurate, the Middle Woodland occupations would not have been during this early season, as the site would have been innundated.

Several Late Woodland sherds were recovered from disturbed contexts while surface collecting. Unfortunately, none of the Late Woodland diagnostics were recovered from stratigraphic positions overlaying Middle Woodland levels. Therefore, the stratigraphic relation of Late Woodland to Middle Woodland is not yet discernable from the recovered data. However, Feature 1 contained Late Woodland ceramic sherds indicating undisturbed Late Woodland contexts remain at the site of the easement.

The lack of Late Woodland materials in the dredge cut profile other than Feature 1, suggests the Late Woodland occupations levels had been, for the most part, disturbed in the easement area from clearing. It is likely that at undisturbed areas of the site, stratigraphic positioning of the prehistoric components remain. However, that the components recognized at the easement continue to the undisturbed portions of the site is not known. On the other hand, Late Woodland deposits in the form of Features, Middle Woodland component deposits in the form of a habitation midden and pit features, and possibly an Early Woodland occupation have been documented within the easement area of the site.

Activities Represented at 11Jd126

Several specific prehistoric activities were reflected in the remains recovered at 11Jd126. These include general habitation at least on a seasonal basis, floral and faunal utilization, including shell extraction and processing, flint knapping, intentional control of fire, and excavation of pits for storage or refuse.

The variety and amount of prehistoric materials recovered in the upper silt horizon and features implies utilization of the site location for more than a short term transitory stop-over. Materials recovered include lithic debitage, ceramic sherds, burned bone, burned limestone, shell, and charred floral remains. In the excavations of the silt horizon above the features, lithics and ceramics and charcoal were found at random, although several clusters of sherds were identified implying single depositional events. The cultural deposits within this silt horizon are interpreted to represent a prehistoric sheet midden. Near Feature 3, the artifactual materials within the midden were most concentrated in the dredge cut profile. Diagnostic artifacts in the midden at this location indicate Middle Woodland component affiliation.

At the upper levels of the Middle Woodland midden were indications of the extreme west edge of a shell lens. The lens at one time extended 10-15 meters to the east, but was removed during the initial dredge cut. The shell deposit represents the specific task of obtaining fresh water naiades, which were probably available in the adjacent slough. With the few remaining shell fragments in the dredge cut profile were several pieces of burned limestone. Such association was typical of shell middens located in Pool 10 (James Theler personal communication) and at a shell midden excavated near Rock Island, Illinois (Van Dyke, Overstreet and Theler 1980). Unfortunately, an adequate sample of the shell at 11Jd126 was not retrievable, precluding analysis of the valves and interpretation of river conditions at the time of their extraction.

Interestingly, shells are frequently reported in association with burials in the bluff top mounds along this section of the river (Logan 1976:12, 14, Bennett 1945:102, 114). Several of the mounds with shells contained obvious Hopewell affinities while others are typical of Late Woodland forms. Thus far in Pool 10, shell middens in the lowland floodplain have been affiliated with Late Woodland (Keyes Phase) and pre-Middle Woodland (Prairie Phase) components. However, none have been identified with Middle Woodland (Trempealeau Phase) occupations (Boszhardt 1981).

Other faunal remains at 11Jd126 indicate prehistoric animal exploitation. However, the bone which was recovered from the midden and the features is all very fragmentary and could not be specifically identified. Charred floral remains include seeds, charred nuts and charcoal. The identified charred floral remains indicate plant food resources collected by both Middle and Late Woodland occupants at 11Jd126 during late summer and fall (see Appendix D).

Lithic debitage was recovered primarily from redeposited or disturbed contexts. Because of the small size of the lithic sample and lack of controlled provenience, detailed analysis of the stone was not attempted. However, a variety of flint knapping stages are represented in the total lithic assemblage. For example, several cores of tabular chert were recovered. As no lithic resources are immediately available in the lowland floodplain, the raw material must have been transported to this location. Chert sources are available in the adjacent bedrock walls of the valley and in secondary stream beds which dissect the uplands. None of the lithic debitage recovered can be identified as having originated from a non-local source. Recovered hammerstone fragments indicate direct percussion flaking techniques. The flakes vary in characteristics and size, and represent primary biface reduction and tool refinishing. Several of the flakes have obviously been exposed to fire or intense heat, although intentional heat treating is not yet

demonstrable. At least one of the flakes shows indications of having been modified for tool use. However, the function of this tool is uncertain.

Intentional and controlled fire at the site is indicated by the burned limestone associated with the shell and in the midden, and Feature 3 which is interpreted to have been a hearth. This feature was located at the base of the Middle Woodland midden levels.

Finally, the features which intrude into the sand horizon from the upper silt horizon obviously represent intentionally excavated pits. Within the fill of these pits were materials which suggest final usage as refuse dumps. Their original functions may have differed (e.g. storage), though evidence for other uses were no longer present. Feature 2 contained Middle Woodland diagnostic artifacts, and Feature 1 contained Late Woodland ceramic sherds. These indicate that during both the Middle and Late Woodland occupations, pits were being excavated. Feature 5 may represent a pit from a pre-Middle Woodland component.

Relationship of the Site to its Environment and Resources

The best archaeological indicators of prehistoric ecological relationships between site occupants and their contemporary environments are floral and faunal remains which reflect exploitation of local resources, and infer the reason for the occupation of a particular site. In the case of 11Jd126, as noted above, very few identifiable faunal and charred floral remains were recovered during the minimal amount of testing. However, several general statements may be made regarding the location of 11Jd126.

The site is located in the lowland floodplain of the Upper Mississippi River which today, and probably throughout the Holocene, is environmentally different from the adjacent Pleistocene terraces and Upland regions. Most notable of the

resources available in the floodplain are floral and faunal species which are adapted to wetland environs. Wetland fauna include riparian mammals, fish, shell fish and waterfowl. Evidence from 11Jd126 indicates that shell fish were exploited, though possibly during only one episode of occupation. Wetland floral communities do not include a large population of nut (mast) producing species. However, marsh plants, such as lotus, marsh elder, etc., are plentiful as are disturbed habitat species, such as wild grape, elderberry and chenopodium.

It is of interest that the charred floral remains contained hickory, cherry, and chenopodium. Although the samples from which these were recovered and identified were admittedly small, they add some insight into the prehistoric vegetation of the lowland floodplain. All three of these plant types may be found in the floodplain today, however, hickory and cherry are rare. Their presence in Feature 1 (hickory) and Feature 2 (cherry) suggest a somewhat different floral community in the floodplain prehistorically. The pre-lock and dam floral pattern apparently contained a greater percentage of nut (mast) producing trees (U.S. Army Engineers 1978: 5-8), however, the General Land Office Survey Records for the region do not mention hickory or cherry in floodplain settings (Bennett 1839-40). That hickory and cherry are usually found at drier locations than the present floodplain in general has to offer, implies that the floodplain at Pool 12 during Middle and Late Woodland times may have been somewhat drier than during the historic period.

Selection of levee crests for occupation in the lowland floodplain is a logical and expected phenomenon. These formations represent the highest and, therefore, the driest locations. In addition, levees border natural water courses which is advantageous for several reasons, including immediate access to channel resources and transportation routes (be it by boat or canoe during the warm seasons, or over ice during the winter). Further, the levee-channel edge presents an open view

with no blockage to winds which might be comforting during the bug infested warm season. Levee back sides frequently taper to marsh habitat allowing immediate access to resources adapted to such environs.

That 11Jd126 is situated on a levee in the floodplain is expected, but the advantages of levee formations does not explain why the site is specifically located where it is. There are vast miles of levees within the floodplain, and indeed the Pool 12 survey in 1981 documented prehistoric selection of a number of these.

Were the prehistoric occupations at 11Jd126 simply a coincidence with no specific reasons for selecting this levee, or were there resources specific to this site which attracted the occupants?

Based on the results of the initial testing, little information is yet available to argue one way or another. However, the geomorphological setting may have been an important consideration for selection of this site. It may be speculated that the lower sand horizon may have attracted prehistoric groups either directly by offering a sandy beach area and facilitating pit digging, or indirectly as a consequence of supporting a more xeric vegetative community, such as a semi-open Oak-Hickory forest. Both the sand beach and Oak forest are in evidence today at the lower end of the levee.

Present Condition

11Jd126 is currently being impacted by erosion along the southeastern bank of the levee bordering Frentress Lake Slough. Rates of erosion have not been measured, however, the fact that a considerable amount of artifactual material was collected from the foreshore in November, only three months after this shore was completely collected, indicates a rapid destruction of cultural deposits. This bank is unprotected with the exception of a 40

meter stretch of shore approximately 20 meters to the northwest of the barge terminal easement where tabular limestone riprap remains from earlier 20th century historic activities. Further destruction of this site is imminent if left unchecked. The erosion is accelerated from irregular high and low water stages which are controlled as much as possible by the Lock and Dam system, and from wakes from pleasure boaters and fisherman who utilize Frentress Lake Slough as an access corridor in and out of Frentress Lake. It is very likely that completion of the barge terminal facilities will increase the rate of shoreline erosion due to barge traffic wakes.

The barge terminal project has already impacted the southeast end of 11Jd126 by having cut a 25-30 meter wide channel through the levee, and by clearing the surface of the remainder of the easement. The initial dredge cut destroyed an unknown quantity and kinds of cultural deposits in addition to the shell lens. Clearing of the easement to the west of the channel has exposed cultural deposits on the surface, and may have removed much of the Late Woodland component deposit. However, the remaining portion of the terminal easement, *in situ* cultural deposits of Middle and Late Woodland, and possibly pre-Middle Woodland occupations have been identified and remain. This area is 25-30 meters wide and ca. 30 meters N-S.

Cultural materials continue to the northwest of the easement for 250 meters. This section of the site undoubtedly contains cultural deposits outside of the easement have not yet been identified with the exception of a possible daub structure. Other cultural deposits in this area may not be similar to those within the easement portions of the site.

Geomorphologically, the southeast third of the site, including the easement portion, differs from the northwestern two-thirds due to the underlying sand horizon. This horizon underlies the easement area and levee crest for 50-75 meters to the northwest of the easement. It has been suggested that the

lower sand horizon may have attracted prehistoric occupants to the site and, therefore, this section of the site may contain differing cultural deposits than the site area to the northwest. Further, the presence of the lower sand horizon facilitates archaeological recognition of feature deposits which might not be discernable to the northwest.

Continued construction plans include widening of the existing barge channel by dredging a parallel strip through the remaining deposits within the easement. An agreement was reached in negotiations with the Dubuque Sand and Gravel Company at the meeting on November 9, 1981, whereas, further construction disturbance to the site area within the easement will be delayed until after June 1, 1982.

Once dredging resumes, the 25-30 meters of the site, which overlays and intrudes into the sand horizon, will be removed leaving 50-75 meters of the site with similar geomorphic and suggestively cultural deposits. However, as noted above, the portion of the site which will not be directly impacted by the barge terminal will be destroyed by erosion unless protected.

CONCLUSIONS

For several reasons, the threatened archaeological site 11Jd126 is deemed significant. These reasons are based on a lack of previously reported archaeological research in the area, and the potentially informative nature of the cultural deposits for several research problems.

Until very recently, little information was available which indicated that archaeological resources existed in the lowland floodplain of the Upper Mississippi River. It was commonly held that riverine resources had been exploited throughout the Holocene, and that short term transitory camps may have been occupied. However, it was also generally conceded that any cultural deposits would have been destroyed through reworking of the river channels.

Investigations in the lowland floodplain of Pool 10 from 1978-1980 by the University of Wisconsin-Madison, proved these unfounded assumptions wrong (Stoltman and Theler 1980, Boszhardt 1982). The Pool 10 study identified 32 prehistoric sites which had components which ranged from the Late Archaic Stage to recent Historic activities. Test excavations were concentrated at selected shell midden sites where stratified multicomponent deposits with excellent preservation were documented. The results of these investigations have substantially added to reconstructions of prehistoric adaptive strategies. For example, during the early Middle Woodland (Prairie Phase) and Late Woodland (Keyes Phase) fresh water mussels (naiades) were being extensively exploited at least seasonally (J. Theler and C. Arzigian 1980, Boszhardt 1982, J. Stoltman, J. Theler, and C. Arzigian personal communication).

Pool 10 is located 60 miles up river from Pool 12 in an area which is topographically dominated by the junction of the Wisconsin and Mississippi Rivers. The setting and known archaeological resources of Pool 10 differ to some degree from Pool 12. For example, no major tributaries meet the Mississippi near Pool 12, and of the 15 lowland floodplain sites thus far

identified in Pool 12, 11Jd126 is the only one known to have contained a prehistoric shell midden. Archaeological differences between Pools 10 and 12 are further implied when considering types of sites on adjacent Pleistocene Terraces and uplands of each area. For example, effigy mounds are extremely common at the confluence of the Wisconsin and Mississippi Rivers while along the margins of Pool 12 only a few are reported. Therefore, the archaeological resources and reconstructed adaptive strategies of Pool 10 cannot be assumed to be the same for Pool 12.

To the south of Pool 12 very few archaeological sites have been reported in the lowland floodplain. Benchley and Gregg (1975) reported the results of survey and testing at 11Ca31, which is located on a former island of a backwater lake. This site is approximately 30 miles down river from 11Jd126. Unfortunately, this site had been badly disturbed, and adaptive strategies of the identified components could not be interpreted.

Minor testing was conducted at three sites in Pool 12 during the 1981 survey. The result of these controlled excavations indicates a wide variability in the nature of the deposits. For example, at 11Jd116, an *in situ* Late Woodland component was identified over 1 meter below the present surface while at 11Jd121 a late prehistoric cultural deposit was uncovered in the top 35 cm. and had been disturbed by pre-lock and dam plowing. The deposits at 11Jd126 appear to be different from those recognized at each of the three tested sites in Pool 12.

Test excavations were conducted at 11Jd126 primarily because *in situ* deposits were exposed during construction of a barge terminal facility. By coincidence, this site was recommended for testing based on the results of the Pool 12 survey. Those recommendations considered the research potential of the site as indicated by the relatively large amount of bone recovered from the shoreline surface collections, which suggested good preservation, and the intriguing recognition of a daub concentration. It was further suggested that the results of

controlled excavations at this side channel site might be compared against a site on the main channel of the river.

Although the reasons for testing 11Jd126 differed from those argued for in the Pool 12 survey report, and sampling strategies were limited to only the easement portion of the site, the results identified a wide variety of *in situ* cultural deposits. These consisted of a sheet midden and several pit features. Analysis of the recovered material remains from these deposits revealed a variety of activities for which chronological control is possible. For example, Middle Woodland diagnostic artifacts were recovered in association with indicators of flintknapping, nut processing, a fire hearth, general habitation refuse dumping and possibly shell extraction and processing. Activities inferred from Late Woodland deposits at the site include fli - knapping, nut processing and habitation refuse. In additi , identified charred floral remains indicate at least l - summer/fall occupation during which some plant collecting occurring. The plant resources exploited could have b obtained from the immediate site environs.

The identified cultural deposits at 11Jd126 were all exposed in the arbitrary slice through the site along the dredge cut profile. The number of features and extent of the sheet midden in this profile suggest that similar deposits remain in, as yet, undisturbed portions of the site. Certainly within the remaining easement area, the likelihood of additional *in situ* cultural deposits is high.

In summary, poor field conditions during archaeological testing at 11Jd126 restricted recovery of the contents of *in situ* cultural deposits to a small sample. However, the recovered remains indicate that more extensive excavations would recover materials which could be used to address a number of research problems. These include subsistance, seasonality and activity indicators which would provide the first interpretive evidence regarding Middle and Late Woodland adaptive strategies in the

lowland floodplain of this area. In addition, stratigraphic control of recovered diagnostic artifacts and radiocarbon dating of organic remains could refine the local culture history chronology, and comparison of the recovered materials to contemporary assemblages from the Upper Midwest would increase the knowledge of regional relationships. Finally, analysis of floral and faunal remains in conjunction with soil characteristics of the individual component deposits would be of use for interpreting past climate and fluvial conditions in this area.

RECOMMENDATIONS

For reasons outlined above, the archaeological site 11Jd126 appears to contain significant deposits which meet the criterion for eligibility to the National Register of Historical Places. In view of the impending destruction of the site, it is recommended that a determination of eligibility be sought. Given the short time period remaining before construction resumes within the barge terminal easement, it is hoped that this action be carried out with some urgency. Eligibility to the National Register would indicate that the significance of the site is accepted, and retrieval of additional data and/or protection measures may be implemented prior to further and eventual complete destruction.

The renewed dredging of the remaining portion of the site area within the easement will totally disturb the cultural deposits at this area of the site. Construction of the barge terminal facilities has already advanced to the point where protection of this area of the site is unrealistic. Therefore, an acceptable archaeological recovery plan for the easement area, prior to June 1, would have no adverse affect on the cultural deposits. If the site is determined eligible for inclusion in the National Register of Historical Places, such efforts in the easement should be undertaken. Non-compliance with this recommendation will sacrifice these cultural deposits.

Three factors need to be considered for developing a suitable recovery plan for the cultural deposits within the barge terminal easement. First, unpredictable field conditions, such as pool water levels and precipitation, will condition the productivity and time of the field efforts. Second, by agreement with the Dubuque Sand and Gravel Company, the field phase of recovery work within the easement must be completed by June 1, 1982. And, third, the site area within the easement is approximately 30x30 meters, with cultural deposits expected to reach

depths of .5-1 meter below the disturbed surface. Thus, the total cultural area to be impacted when dredging resumes, is ca. 900 square meters.

Field conditions proved to be the most limiting factor during the initial testing in 1981. Although water levels were low and compatible for excavation, freezing and thawing temperatures greatly interfered with access to the site and control of the excavations. More intensive recovery should not be attempted until the site is thawed and at least reasonably dry unless absolutely necessary. Unfortunately, during the spring season, these conditions will probably not be ideal due to melting of snow cover at the site and in the entire drainage basin of the Mississippi River to the north of the site. During this season, one can expect a period of raised pool levels which could conceivably inundate the site long after the site, itself, thaws. It is impossible to know exactly when the spring melt waters will recede. However, by late April-early May is a reasonable estimate. Then again, if these months are characterized by high amounts of precipitation, the pool water level may remain high.

As noted earlier, the completion date of June 1 has been set. Thus, actual productive field time will be limited to a period of low water stage following an expected high water stage during spring melt off and/or new precipitation. Assuming that the month of May will witness reasonable field conditions, a maximum of ca. 30 field days would be available for recovery work within the easement. It is difficult to imagine quality excavation within the entire 900 square meters of easement area during so short a period unless employing a large number of qualified persons. Because of the uncertain time period for field work, and the large site area to be investigated, it is recommended that a sampling strategy be employed which will guide the recovery of enough information to address the research problems identified earlier

As part of the site sample, a 1 meter wide test trench from the easement boundary to the dredge cut bank would be useful for identifying stratigraphy and depth of deposits in an east-west direction, which would complement the, roughly, north-south dredge cut profile. As noted earlier, the depth of the cultural and natural deposits appears to shift to the west of the existing dredge cut. The information derived from excavation of an east-west test trench would guide and enable more accurate interpretations of the deposits uncovered in isolated excavation units. The distance from the easement boundary to the dredge cut is 25-30 meters. Therefore, a 1 meter wide test trench for this length would remove 25-30 square meters or 2.7-3.3% of the total site area within the easement.

Given the unknown horizontal configuration of the cultural remains within the easement site area, it seems most appropriate to select a random sample of 2x2 meter excavation units to be excavated following completion of the test trench. The size of the total sample recoverable will be dependent upon the conditions, the size of crew, and what is encountered in the excavations. It is estimated that a crew of 10 experienced persons could excavate the test trench during a period of 5-7 days (50-70 man days) Under the assumption that 30 field days will be available, it is reasonable to estimate that ten 2x2 meter units can be carefully excavated with a crew of 10 persons (totalling 230-250 man days). This amounts to 4.4% of the total site area within the easement area.

RECOVERY TECHNIQUES

All excavations would employ acceptable archaeological techniques to insure provenience control and recovery of a variety of remains. Excavation techniques will consist of careful skim shovelling and trowelling which will maintain accurate horizontal and vertical control while aiding recognition of soil changes, artifacts concentrations or other features. Horizontal control will be coordinated by provenience based on the site grid. Vertical control will be maintained by excavating in arbitrary 5 cm. levels unless distinct cultural or natural stratigraphic separation is observed.

Excavated soils will be water screened through 1/4" hardware cloth utilizing hydraulic pumps. This type of screening will facilitate separation of artifactual materials from the fine grained sticky silts in which the cultural deposits have been identified.

Soil samples will be collected from each horizontal and vertical provenience. These samples will be processed by flotation techniques to insure recovery of all artifactual materials, including floral and faunal remains. Flotation may be attempted at the site with heavy and light fraction materials separated and materials greater than a very fine mesh screen saved for analysis. In addition, soil samples from selected vertical columns will be collected for fluvial deposition analysis. Ideally, the cultural components will provide an age of the soil horizons.

Plan views and profiles of the excavation units and all features will be recorded by detailed mapping and photography.

All artifactual materials will be returned to the Great Lakes Archaeological Research Center for analysis and identification. Certain types of materials (e.g. floral and faunal remains and soil samples) will be analyzed by specialists.

Analysis will focus on the research problems outlined above. For example, diagnostic ceramic and lithic materials will be described and interpreted within regional component affiliations,

thus providing a relative chronology. Functional questions will also be addressed so as to discern specific activities carried out at the site. And, floral and faunal remains will be identified and interpreted to the resources exploited, season(s) of occupation and past climatic conditions. Taken as a whole, this information will allow accurate reconstruction of the adaptive strategies of the prehistoric occupants at 11Jd126. It is hoped that adequate samples of charred floral remains can be collected from association with identified component deposits which could be submitted for radiocarbon assay and, thus, provide more accurate dates of the deposits.

Although the site area outside of the easement will not be directly and immediately impacted by further construction, this area is being disturbed by uncontrolled erosion which will likely be accelerated by barge wakes once the barge terminal facility is opened. This area could be protected by stabilizing the bank and shore with rip-rap. The cost of such an undertaking is unknown. However, bank stabilization is planned for the banks of the barge channel within the easement, and possibly this project could be extended to the site area along Frentress Lake Slough.

Such a procedure would preserve the cultural resources at 11Jd126 to the northwest of the easement. However, in view of the lack of knowledge about the deposits at that portion of the site, and suggestive evidence that this area may contain different information than the easement area (e.g. a possible daub structure and different soil stratigraphy), limited test excavations should be undertaken. This is especially warranted if rip-rapping is found to be unfeasible. Because this area will not be affected by the barge terminal construction, and recovery efforts within the easement will be pressured for time, test excavations outside of the easement could be delayed until after June 1, 1982. A general testing strategy for this area is presented below. This plan should be open to revision based upon the information recovered during mitigation of the easement portion of the site.

Test excavations outside of the easement area of the site would also be conditioned by pool water levels. Following the completion of the recovery efforts in the easement area, and assuming water levels remain low, test excavations outside of the easement may be initiated. The results of the recovery within the easement may suggest the types of activities to be found in the deposits occurring to the northwest of the easement. This may be especially true in the southeastern most part where the lower sand horizon continues to form the base of the levee. However, this assumption should be tested by controlled excavation. That the soil properties of the site area to the northwest of the extent of the lower sand horizon are different and, therefore, may contain different types of cultural deposits, also needs to be tested. At this time, the only indication of a specific type of cultural deposit outside of the easement is the unique suggestion of a daub structure near the extreme northwest end of the site. Therefore, it is recommended that limited controlled excavations be located at the site area underlain by the sand horizon, the site area not underlain by the sand, and in the area where daub is eroding from the levee bank.

In the non-easement area of the site underlain by sand, two 2x2 meter test units should provide enough data to compare the nature of the deposits to those identified within the easement. The lower sand horizon has been traced for 50-75 meters to the northwest of the easement boundary. It is recommended that one of the two test units be situated at the levee bank where a natural profile may guide the vertical excavations. It would be useful to place the second test pit to the north of the first on the backside of the levee to trace the deposit to the north and compare the distribution of cultural deposits and extent of the sand horizon in that direction with the measurements recorded at the dredge cut profile within the easement. The depth of the cultural deposits below the undisturbed levee surface at these two test units may be compared to the easement area where the natural surface had been disturbed to an unknown extent. For

systematic purposes to be discussed below, it is recommended that these test units be placed 25 meters to the north of the easement boundary.

Approximately 175-200 meters of site area remain on the levee to the northwest of the extent of the lower sand horizon. This section of the levee consists only of silts. Within this area the potential daub structure is located.

It is recommended that an additional four 2x2 meter test units be placed within this section of the levee. These test pits could be placed at 50 meter intervals beginning 75 meters northwest of the easement boundary. Such spacing of the test units would provide a systematic examination of the deposits in this area of the site. The test pit interval location nearest the daub concentration could be shifted, if necessary, to include the possible structure. Due to the narrowness of the levee and the presence of the exposed bank cut, it would be most advantageous to utilize the bank profile in guiding the test unit excacations. Therefore, these units should be placed adjacent to the eroding bank.

In summary, limited testing of the site area outside of the easement would consist of a total of six 2x2 meter units. These would be placed as follows: Units 1 and 2 would be located 25 meters northwest of the easement boundary with one located on the edge of the levee bank, and the second on the backside of the levee. These test units would recover comparable data regarding the deposits overlaying the sand horizon. Units 3-6 would be placed at 50 meter intervals from each other beginning with an initial interval from Units 1 and 2. Units 3-6 will be situated over the portion of the levee consisting only of silts, and also should be placed adjacent to the eroding levee bank. One of these may be shifted from the 50 meter interval location to be placed over the concentration of daub near the northwest end of the site in hopes of identifying the origin of these materials. Excavation techniques will follow those described for the recovery efforts within the easement. Because of the possible

increased depth of the cultural deposits as the depth of silt increases, it is estimated that the test units to the northwest of the easement boundary will require eight man days apiece. Therefore, a total of nearly 50 man days should be planned for excavation of all six test units.

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APPENDIX A: Results of Floral Analysis

A small quantity of archaeological plant remains were recovered from 11Jd126. Wood charcoal was present in most samples, but only a few small fragments of nutshell and a few seeds were recovered. The non-charcoal materials are tabulated in the accompanying table, and a few comments may be made about them.

Subsistence: Nutshell fragments occurred in 10 samples from 3 of 4 features, but the total quantity is very small (less than 1 gram total). While species identifications are not possible, most of the shell may be hickory. Two cherry pit fragments were also identified, which, with the nuts may represent a component of the inhabitants' diet.

Seasonality: The nuts and cherry would have been avilable in late summer to fall, and the Chenopodium from fall through early winter. However, storage of the food resources may have delayed their utilization until winter or early spring.

Feature structure/formation: Within each of the features there is variability in the abundance of different kinds of plant materials. The top zone of each shows more modern seeds, and little charcoal (Feature 1: Zone A; Feature 2: Samples 1-4; Feature 3, Sample A). These may well represent a mixed or disturbed area of the features. Feature 5, particularly the silt lens, had very little charred material, but many modern seeds, including chenopodium and sedges, that appear to have been gnawed. A corner has been removed, and the endosperm is absent. This whole feature, though in a sealed context, may have been disturbed.

11Jd126 FLORAL MATERIALS - NON-WOOD, CHARRED MATERIAL

Feature 1: (10 cups from each sample)

Zone A, 9-10cm - none
20-30cm - no seeds
1 unidentifiable non-seed fragment
30-41cm - none

Zone B, 40-55cm - 5 charred nutshell fragments
1 fragment Chenopodium sp

Zone C, 50-60cm - 2 Juglandacae (walnut or hickory) shell fragments
1 nutshell fragment
1 Chenopodium sp. fragment

60-70cm - 3 nutshell fragments
1 cf Portulaca sp. fragment
1 potentially identifiable seed
3 unidentifiable fragments

Zone D, 70-80cm. - 1 Carya sp nutshell fragment (hickory)
4 Juglandaceae nutshell fragments (walnut or hickory)
70cm. - bottom - 1 small nutshell fragment
80-85cm. - none

Profile, E-1/2 - 1 Carya sp nutshell fragment (hickory)
1 unidentifiable non-seed fragment

Feature 2: (10 cups from each sample)

Sample 1, 0-10cm.- 1 small nutshell fragment
1 unidentifiable fragment
1 potentially identifiable seed

Sample 2, 11-20cm.- none

Sample 3, 21-30cm.- none from first sample
21-30cm.- 1 Chenopodium sp. fragment

Sample 4, 31-40cm.- none

Sample 5, 41-50cm.- 1 Chenopodium sp. fragment
41-50cm.- (second sample) - 1 probable nutshell fragment
2 unidentifiable fragments of seed

Sample 6, 51-60cm.- first sample - 1 cf. Prunus sp. fragment (cherry pit)
second sample- 1 cf. Prunus sp. fragment

Sample 7, 61-70cm.- none

Profile E-1/2 - none

11Jd126 FLORAL MATERIALS, CHARRED (continued)

Feature 3: (2-4 cups from each sample, except NW-1/4 - 20 cups)

Sample A - None

Sample B, 10-30cm.- 3 nutshell fragments

Sample C, 20-25cm.- 2 small nutshellf fragments

Sample D, 25-36cm.- none

Sample E, 36-46cm.- none

Sample F - none

Sample G, - 2 unidentifiable fragments of seeds

NW-1/4 - 3 unidentifiable seed fragments

Feature 5:

60 cm. bs, silt lens - (6 cups) - none
62-70 cm. below silt lens, possible second lens with bleached sand
(2 samples - 13 cups) - none

Modern seeds:

These were not systematically sorted or identified. Species represented include:

Chenopodium sp. (lambsquarters)

Solanum/Physalis sp. (nightshade family)

Portulaca oleracea L. (purslane)

Oxalis sp. (wopodsorrel)

Rubus sp. (blackberry)

Sedge and grass seeds also present

APPENDIX B: 11Jd126 Lot Check Lists

PROJECT: _____

Site: 11Jd126

Provenience Shoreline Surface Collection Frontress Lake Slough 140-160 m. N. of datum

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone	1		
Micellaneous			

HISTORIC

Glass _____

Metal _____

Miscellaneous _____

Other

Burned Clay, Fiber tempered (Daub) (10)

Name Boszhardt

Date 11/6/81

PROJECT: _____

Site: 11Jd126

Provenience Sh reline Surface Collection Frentress Lake Slough, 100 m. NW of datum

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body	4				
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated	9				

Organic	Burned	Unburned	
Bone			
Micellaneous	1 charcoal		

HISTORIC

Glass

Metal 1 rusted fragment

Miscellaneous

Other

Name Boszhardt

Date 11/6/81

PROJECT: _____

Site: 11Jd126

Provenience Shoreline Surface Collection Frentress Lake Slough (General)

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	5	1 shatter
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body	2				
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass

Metal

Miscellaneous

Other

Name Boszhardt

Date 11/6/81

PROJECT: _____

Site: 11 Jd 126

Provenience S-2 Shoreline SW of datum

MATERIALS:

Lithics

Cores		
Bifaces	1	small, possible crude side notched point
Retouched Flakes		
Unretouched Flakes	4	1 heat treated
Points	1	straight stem base
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock	3	2 burbed limestone, 1 ?
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim	1				
Decorated Body	1				
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass _____

Metal _____

Miscellaneous 1 brick fragment

Other

Grit tempered rim- cord impressed (3mm thick)
Grit tempered decorated body sherd- fabric impressed (3mm thick)

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: 11 Jd 126

Provenience S-1 Surface of Easement

MATERIALS:

Lithics

Cores	5	1 Basalt, 1 bipolar core fragment
Bifaces		
Retouched Flakes		
Unretouched Flakes	39	1 basalt, 10 shatter
Points		
Knives		
Scrapers		
Hammerstone	1	Basalt cobble
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand	None
Rim						1
Decorated Body	2					
Cord-marked Body	1				1	
Smoothed-over Cord-marked Body	2					
Smooth Body						
Exfoliated					1	

Organic	Burned	Unburned	
Bone		2	
Micellaneous	2 shell valves not identified, 1 charcoal		

HISTORIC

Glass _____

Metal _____

Miscellaneous _____

Other

Untempered rim- punctations, (2.5mm thick) punctation diameter 1mm depth 1mm

Grit tempered decorated body sherds- cord impressed (4&6mm thick)

Undecorated grit temp. bodysherds- (1,2,&3mm thick)

Cord marked grit temp. sherd- (1mm thick)

Sand temp. cord marked sherd- interior exfoliated

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: 11 Jd 126

Provenience 8N-4N Dredge cut scrapings Features 1/2.

MATERIALS:

Lithics

Cores	3	Fragments
Bifaces		
Retouched Flakes		
Unretouched Flakes	5	
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body	1		1	1	
Cord-marked Body	1				
Smoothed-over Cord-marked Body	1				
Smooth Body					
Exfoliated	2			2	

Organic	Burned	Unburned	
Bone			

Miscellaneous 1 shell hinge

HISTORIC

Glass _____

Metal _____

Miscellaneous 1 Flower pot rim

Other Limestone temp. sherd is partially eroded. Trailed line on smoothed surface. Probably same vessel as sherd from ceramic concentration with Feature 2. (3mm thick)
Decorated Grit temp. partially eroded cord impressed (2mm thick)
Grog temp sherds have sand temper also.
Decorated grog sherd badly eroded Dentate stamped. Cord impressed lines perpendicular to cord marked surface (6mm thick)
Smoothed over cord marked sherd (7mm thick)

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: 11 Jd 126

Provenience 8N-4N Dredge cut scrapings Features 1/2.

MATERIALS:

Lithics

Cores	3	Fragments
Bifaces		
Retouched Flakes		
Unretouched Flakes	5	
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body	1		1	1	
Cord-marked Body	1				
Smoothed-over Cord-marked Body	1				
Smooth Body					
Exfoliated	2			2	

Organic	Burned	Unburned	
Bone			
Micellaneous	1 shell hinge		

HISTORIC

Glass _____

Metal _____

Miscellaneous 1 Flower pot rim

Other Limestone temp. sherd is partially eroded. Trailed line on smoothed surface. Probably same vessel as sherd from ceramic concentration with Feature 2. (3mm thick)
Decorated Grit temp. partially eroded cord impressed (2mm thick)
Grog temp sherds have sand temper also.
Decorated grog sherd badly eroded Dentate stamped. Cord impressed lines perpendicular to cord marked surface (6mm thick)
Smoothed over cord marked sherd (7mm thick)

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: 11 Jd 126

Provenience Dredge Cut scrapings Feature 5/2 4N-2.5S

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	1	
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body	1				
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass _____

Metal _____

Miscellaneous _____

Other

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: ~~11 Jd 126~~

Provenience 3.5S-6S Easement Dredge cut scrapings between Features 4&3

MATERIALS:

Lithics

Cores		
Bifaces	1	Fragment
Retouched Flakes		
Unretouched Flakes	7	2 Shatter
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body	3				
Cord-marked Body					1
Smoothed-over Cord-marked Body					
Smooth Body	1				
Exfoliated				1*	

Organic	Burned	Unburned	
Bone		1	Probably mammal or bird or reptile

Micellaneous 2 shell (1 Three Ridge, 1 Ebony Shell- endoderm partially preserved)

HISTORIC

Glass _____

Metal 1 lead

Miscellaneous _____

Other

Decorated ceramics: 3 Cord Impressed are partially eroded, 3 mm thick, probably sme vessel
Sand tempered = 4.5 mm thick
*Smooth body = 2 mm thick (grog and sand tempering)

Name Boszhardt
Date 11/5/81

PROJECT: _____

Site: 11 Jd 126

Provenience Feature 1 Slump

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	18	3 shatter, 1 vial of 75 tiny flakes*
Points		* from water screening w/ 20 mesh screen.
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock	5	3 pebbles, 2 limestone
Fire-cracked Rock	4	burned limestone
Miscellaneous		

Ceramics **	Grit	Shell	Limestone	Grog	Sand
Rim	1		1		
Decorated Body	1				
Cord-marked Body	6		1		
Smoothed-over Cord-marked Body	1		3		
Smooth Body					
Exfoliated	1				

** 1 vial of tiny ceramic fragments sorted by 10 power microscope from 20 mesh water screening

Organic	Burned	Unburned	
Bone			
Micellaneous	1 vial burned and unburned bone, charcoal.		

HISTORIC

Glass 1 Bottle Fragment

Metal 3 Rusted

Miscellaneous 1 Concrete Fragment

Other Limestone temp. cord marked sherd (4mm thick) contains sand also.
Limestone smoothed over cord marked (3-4mm thick)
Grit rim -very small fragment (3mm thick) knot impression on exterior lip
Grit decorated body- trailing over cord marked surface (2-3mm thick)
Limestone tempered sherds also contain grit.
Limestone decorated body- cord impressed (4.5mm thick)
Grit cord marked body sherds probably from same vessel as decorated body and rim sherds (all ca. 2-3mm thick)

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: 11Jd126

Provenience Feature 1 Zone A

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	4	1 shatter
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body	1				
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated	2				

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass _____

Metal _____

Miscellaneous _____

Other

Name Boszhardt

Date 1/6/82

PROJECT: _____

Site: 11Jd126

Provenience Feature 1 Zone b

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	1	shatter
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					

Organic	Burned	Unburned
Bone		
Micellaneous		

HISTORIC

Glass _____

Metel _____

Miscellaneous _____

Other

Name Boszhardt

Date 1/8/82

PROJECT: _____

Site: 11Jd126

Provenience Feature 1 Zone C

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body	1				
Smoothed-over Cord-marked Body					
Smooth Body					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass _____

Metel _____

Miscellaneous _____

Other

Name Boszhardt

Date 1/6/82

PROJECT: _____

Site: 11Jd126

Provenience Feature 1 Zone D

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	2	1 shatter
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body	1				
Smooth Body					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass

Metel

Miscellaneous

Other

Name Boszhardt

Date 1/8/82

PROJECT: _____

Site: 11 Jd 126

Provenience Feature 2 Level 1, 0-10 cm. (midden?)

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes	1	
Unretouched Flakes	9	
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous	1	Fossilized Limestone/sandstone

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body	1				
Smoothed-over Cord-marked Body					
Smooth Body	1				
Exfoliated	5				

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass 1 Brown Fragment

Metal _____

Miscellaneous 1 Brick Fragment

Other

Grit tempered smooth-sherd (5mm thick)
Grit tempered cord marked- interior surface exfoliated.

Name Robert Boszhardt

Date _____

PROJECT: _____

Site: 11 Jd 126 E

Provenience Feature 2 Ceramic concentration Level 2,20-25 cm.

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body			1		
Cord-marked Body					11
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass	
Metal	
Miscellaneous	

Other

Name B. Boszhardt

Date 1-25-82

PROJECT: 80-47

Site: 11 Jd126E

Provenience Feature 2 Level 2

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	4	(1 blade)
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body					2
Smooth Body					
Exfoliated					2

Organic	Burned	Unburned	
Bone			
Micellaneous	1 vial of charcoal		

HISTORIC

Glass

Metal

Miscellaneous

Other

1 sherd 7-8 mm thick all sherds sand and grit

Name B. Boszhardt
Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126E

Provenience Feature 2 Level 3

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	3	
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock	2	Burned Limestone
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					2
Smoothed-over Cord-marked Body					
Smooth Body					1
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass

Metal

Miscellaneous

Other

Sherds are 7-8 mm thick sand and grit tempered

Name B. Boszhardt

Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126 E

Provenience: Feature 2 Level 4

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					1
Cord-marked Body	1				
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated	1				1

Organic	Burned	Unburned
Bone		
Micellaneous		

HISTORIC

Glass	
Metal	
Miscellaneous	

Other

Name B. Boszhardt

Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126 E

Provenience Feature 2 Level 5

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					1

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass	
Metal	
Miscellaneous	

Other

Name B. Boszhardt
Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126E

Provenience (Above Feature 3) excavation Level 2

MATERIALS:

Lithics

Cores	
Bifaces	
Retouched Flakes	
Unretouched Flakes	2
Points	
Knives	
Scrapers	
Hammerstone	
Grinding Stone	
Unmodified Rock	
Fire-cracked Rock	
Miscellaneous	

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body	2				
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					

Organic	Burned	Unburned
Bone		
Micellaneous		

HISTORIC

Glass

Metal

Miscellaneous

Other

Decorated body sherd- cord wrapped stick over smoothed, with sand in paste

Name B.B.

Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126 E

Provenience (Above Feature 3) excavation Level 3

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes	1	
Unretouched Flakes	1	
Points		
Knives		
Scrapers		
Hammerstone	1	Fragment
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock	4	Burned Limestone
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim	1				
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass

Metal

Miscellaneous

Other

Name B. Boszhardt

Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126 E

Provenience (Above Feature 3) excavation level 3

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	3	(2 shatter)
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body	2				
Smoothed-over Cord-marked Body					
Smooth Body	1				
Exfoliated	12				

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass

Metal

Miscellaneous

Other

Decorated Body sherd- cord wrapped stick over smoothed with sand in paste.

Name B.B.
Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126 E

Provenience Feature 3, Excavation level 4

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes	2	
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock	2	Burned Limestone
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body	20				
Smooth Body					
Exfoliated	27				

Organic	Burned	Unburned	
Bone			
Micellaneous			

HISTORIC

Glass

Metal

Miscellaneous

Other

Name B. Boszhardt

Date 1-25-82

PROJECT: 80-46

Site: 11 Jd 126 E

Provenience Feature 3

MATERIALS:

Lithics

Cores		
Bifaces		
Retouched Flakes		
Unretouched Flakes		
Points		
Knives		
Scrapers		
Hammerstone		
Grinding Stone		
Unmodified Rock		
Fire-cracked Rock		
Miscellaneous		

Ceramics	Grit	Shell	Limestone	Grog	Sand
Rim					
Decorated Body					
Cord-marked Body					
Smoothed-over Cord-marked Body					
Smooth Body					
Exfoliated					

Organic	Burned	Unburned	
Bone			
Micellaneous			1 vial charcoal

HISTORIC

Glass

Metal

Miscellaneous

Other

Name B.B.

Date 1-25-82

APPENDIX C: Letter from Dr. Richard C. Anderson, Laboratory Sheets for Grain Size Analyses and Cumulative Weight Percentage Curves

Augustana
COLLEGE
ROCK ISLAND, ILLINOIS
61201

DEPARTMENT OF GEOLOGY

March 5, 1982

Mr. Robert Boszhardt
Great Lakes Archaeological Research Center, Inc.
Cultural Resource Management
P.O. Box 1304
Waukesha, WI 53187

Dear Bob:

I hope I'm not getting this information to you too late. There have just been too many things to do!

We ran size analyses of the samples I collected (section 1) and those we collected together (core 1), on December 12. We did not run the samples from your core 2 because of time constraints and because I didn't want to run the costs up. They could be run this spring, however, for something under $100. Being entirely fine-grained, they could add another important dimension to this study.

I appreciate the descriptions and photos in your letter of December 17. I agree with your assumption that the back side of the levee marks the north limit of the sand at the depth of the water table.

The results of our analyses are summarized in figure 1. In general, the sand is fine and of uniform grain size (well sorted). The size-frequency distribution of most sediments is normal (Gaussian). Among other things, this means that the distribution is symmetrical around the mean. All the sand samples display this property although the core sample from 110 cm depth is slightly skewed toward the coarser sizes. In addition, the sand in the cut bank (section 1) below the upper 10 cm shows very faint, undisturbed, stratification. In contrast, the silt from the cut bank and the upper 30 cm from core 1 is not only finer grained, it is also massive (unstratified), poorly sorted, and strongly fine-skewed. The silts also display a blocky structure suggestive of soil development.

These characteristics are similar to those attributed to natural levees by Allen (1965), Fisk (1947), Jackson (1975), and Ray (1976). Furthermore, it appears as though the sediment on the crest of the levee, though probably not on the lower flanks and adjoining backswamps, is the result of a single flood event. The lens of shells shown in your photo is not necessarily inconsistent with this interpretation inasmuch as the shells, being flat and of low density, may behave hydrologically similarly to the enclosing sediment. On the other hand, the shells appear to lie well off the crest of the levee where burial by sediments of lesser floods may have occurred. Hence they may represent a former land surface. The lack of stratification in the silt and upper part of the sand is very likely the result of post-depositional disturbance by inorganic processes (slump, frost heave, etc.)

and by organic activity, perhaps including man himself. The very poor sorting and strongly fine-skewed character of these uppermost sediments also indicate that they have been disturbed.

In figure 2 I suggest a working hypothesis for a sequence of channel (thalweg) locations along this reach of the river. It should be noted that the thalweg is the main channel, the thread of fastest moving, deepest water. It does not constitute the entire width of the river, and an abandoned thalweg may continue to carry flow for an extended period of time after the thalweg has migrated elsewhere. According to this hypothesis the thalweg at the mouth of the Menominee River has migrated southwestward toward the Iowa shore. I have indicated the relative age of these thalwegs, but aside from noting that they are all Holocene, I have no basis for assigning absolute ages to them. Thalweg 1 could have been occupied as long ago as several thousand years. Since that time the Menominee River has built an alluvial fan on the valley floor and has occupied and abandoned several courses across the floodplain.

The natural levee upon which the archaeological site occurs was built at the time the Frentress Lake Channel (thalweg 2) served as the thalweg. Again, I have no basis for assigning an age to this thalweg, but your archaeological data indicate a minimum age of about 2000 years.

This is a fascinating problem, and I wish I had more time to devote to it. Perhaps I can get back to it next summer. In the meantime, I hope these ideas will be of some value to you.

You asked about the value of Butzer's report on the lower Illinois valley as an aid in understanding Pool 12. I think the two valleys are very similar, both in terms of present morphology and Holocene history. I think Butzer's generalizations can be applied quite profitably to Pool 12.

Best regards,

Dick

Richard C. Anderson
Chairman, Department of Geology

RCA/ks
Encs.

P.S. The references I cited earlier are attached.

Allen, J. R. L., 1965, Late Quaternary Niger delta, and adjacent areas: sedimentary environments and lithofacies. American Association of Petroleum Geologists Bulletin, v. 49, p. 547-600.

Fisk, H. N., 1947, Fine-grained alluvial deposits and their effect on Mississippi River activity. Mississippi River Commission, 78 p.

Jackson, Roscoe G., II, 1975, Velocity-bedform-texture patterns of meander bends in the lower Wabash River of Illinois and Indiana. Geological Society of America Bulletin, v. 86, p. 1511-1522.

Ray, P. K., 1976, Structure and sedimentological history of the overbank deposits of a Mississippi River point bar. Journal of Sedimentary Petrology, v. 46, p. 788-801.

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126 SECTION 1

Sample No. base (1.5' deep) of UNIT 1 Analyst Don Hiller Date 12/21/81

Sample description well-sorted fine sand; color (dry) light yellowish brown 10 YR 6/4 (Munsell)

Summary of preliminary treatment Sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 46.0406 g

Cumulative weight (W_c) 45.9823 g

Weight of split sample

esh	Size mm.	φ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
24	0.71	0.50	0.0877				0.0877	0.19	0.19
8	0.59	0.75	0.1323				0.2200	0.48	0.29
22	0.50	1.00	0.4410				0.6610	1.44	0.96
35	0.42	1.25	1.4298				2.0908	4.55	3.11
42	0.35	1.50	1.7132				3.8040	8.27	3.73
48	0.30	1.75	6.1366				9.9406	21.62	13.35
60	0.25	2.00	7.4656				17.4062	37.85	16.24
5	0.21	2.25	15.3688				32.7750	71.28	33.42
80	0.177	2.50	8.3487				41.1237	89.43	18.16
100	0.149	2.75	3.9448				45.0685	98.01	8.58
115	0.125	3.00	0.5862				45.6547	99.29	1.27
150	0.105	3.25	0.1588				45.8135	99.63	0.35
170	0.088	3.50	0.0859				45.8994	99.82	0.19
200	0.074	3.75	0.0318				45.9312	99.89	0.07
250	0.0625	4.00	0.0167				45.9479	99.93	0.04
		4	0.0344				45.9823	100	0.07

Error $1-\left(\frac{2W_c}{W_s+W_c}\right) \times 100 = 0.063\ \%$

|| JD 126 base (1.5' deep) of UNIT 1

ϕ 5 ≈ 1.28 ϕ | ϕ 75 ≈ 2.30 ϕ
ϕ 16 ≈ 1.67 ϕ | ϕ 84 ≈ 2.41 ϕ
ϕ 25 ≈ 1.83 ϕ | ϕ 95 ≈ 2.62 ϕ
ϕ 50 ≈ 2.08 ϕ

Mean :

$$M_z = \frac{1.67 + 2.08 + 2.41}{3} = 2.05\ \phi$$

Standard Deviation :

$$\sigma_I = \frac{2.41 - 1.67}{4} + \frac{2.62 - 1.28}{6.6} = 0.3880$$

WELL SORTED (FOLK)

Skewness :

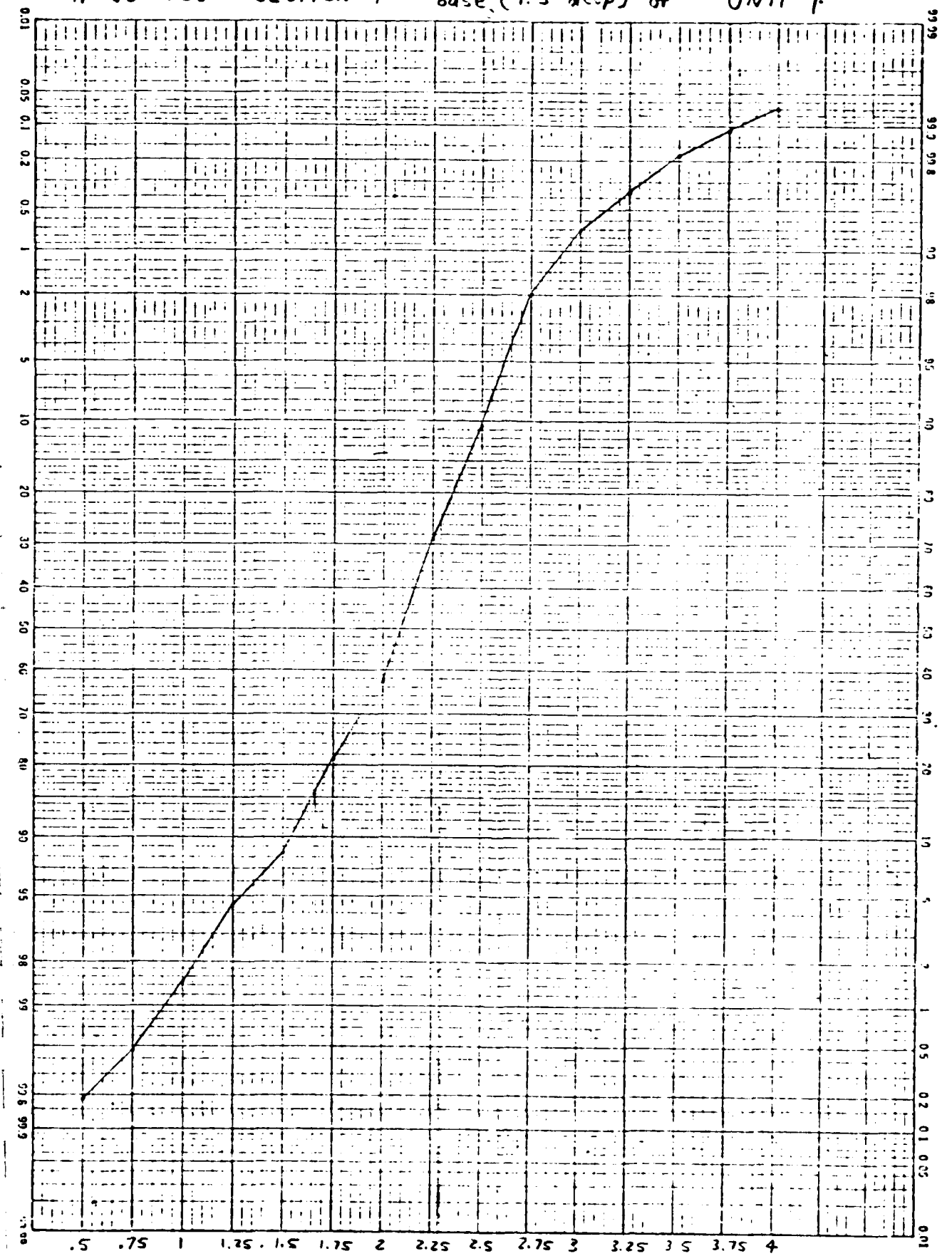
$$Sk = \frac{1.67 + 2.41 - 2(2.08)}{2(2.41 - 1.67)} + \frac{1.28 + 2.62 - 2(2.08)}{2(2.62 - 1.28)}$$

$$= -0.0541 + (-0.0970) = -0.1511$$

COARSE - SKEWED (FOLK)

Kurtosis :

$$K_G = \frac{2.62 - 1.28}{2.44(2.30 - 1.83)} = 1.1685$$


11 JD 126 SECTION 1 base (1.5' deep) of UNIT 1.
CUMULATIVE PERCENT
.5 .75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126 SECTION 1

Sample No. top of UNIT 1 Analyst Don Heller Date 12/21/81

Sample description quartz sand ; color (dry) yellowish brown 10 YR 5/4 (Munsell)

Summary of preliminary treatment Sand fraction large enough to only require dry - sieving.

Total sample weight (W_s) 54.5907 g

Cumulative weight (W_c) 54.2456 g

Weight of split sample

esh	Size mm.	ϕ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
24	0.71	0.50	0.0504				0.0504	0.09	0.09
8	0.59	0.75	0.1209				0.1713	0.32	0.22
32	0.50	1.00	0.4038				0.5751	1.06	0.74
35	0.42	1.25	1.1092				1.6843	3.10	2.04
2	0.35	1.50	2.2537				3.9380	7.26	4.15
48	0.30	1.75	8.9601				12.8981	23.78	16.52
60	0.25	2.00	10.1244				23.0225	42.44	18.66
5	0.21	2.25	16.9000				39.9225	73.60	31.15
80	0.177	2.50	7.8121				47.7346	88.00	14.40
10	0.149	2.75	3.9313				51.6659	95.24	7.25
15	0.125	3.00	1.0685				52.7344	97.21	1.97
150	0.105	3.25	0.6518				53.3862	98.42	1.20
70	0.088	3.50	0.3718				53.7580	99.10	0.69
200	0.074	3.75	0.1898				53.9478	99.45	0.35
50	0.062	4.00	0.0563				54.0041	99.56	0.10
		< 4	0.2415				54.2456	100	0.45

$$\text{Error } 1 - \left(\frac{2W_c}{W_s+W_c}\right) \times 100 = \frac{108.4912}{108.8303} \times 100 = 0.317\%$$

11 JD 126 SECTION 1 top of UNIT 1

ϕ 5 ≈ 1.32 ϕ ϕ 75 ≈ 2.28 ϕ

ϕ 16 ≈ 1.66 ϕ ϕ 84 ≈ 2.42 ϕ

ϕ 25 ≈ 1.78 ϕ ϕ 95 ≈ 2.73 ϕ

ϕ 50 ≈ 2.05

Mean :

$$M_Z = \frac{1.66 + 2.05 + 2.42}{3} = 2.04\ \phi$$

Standard Deviation :

$$\sigma_I = \frac{2.42 - 1.66}{4} + \frac{2.73 - 1.33}{6.6} = 0.4021$$

WELL SORTED (FOLK)

Skewness :

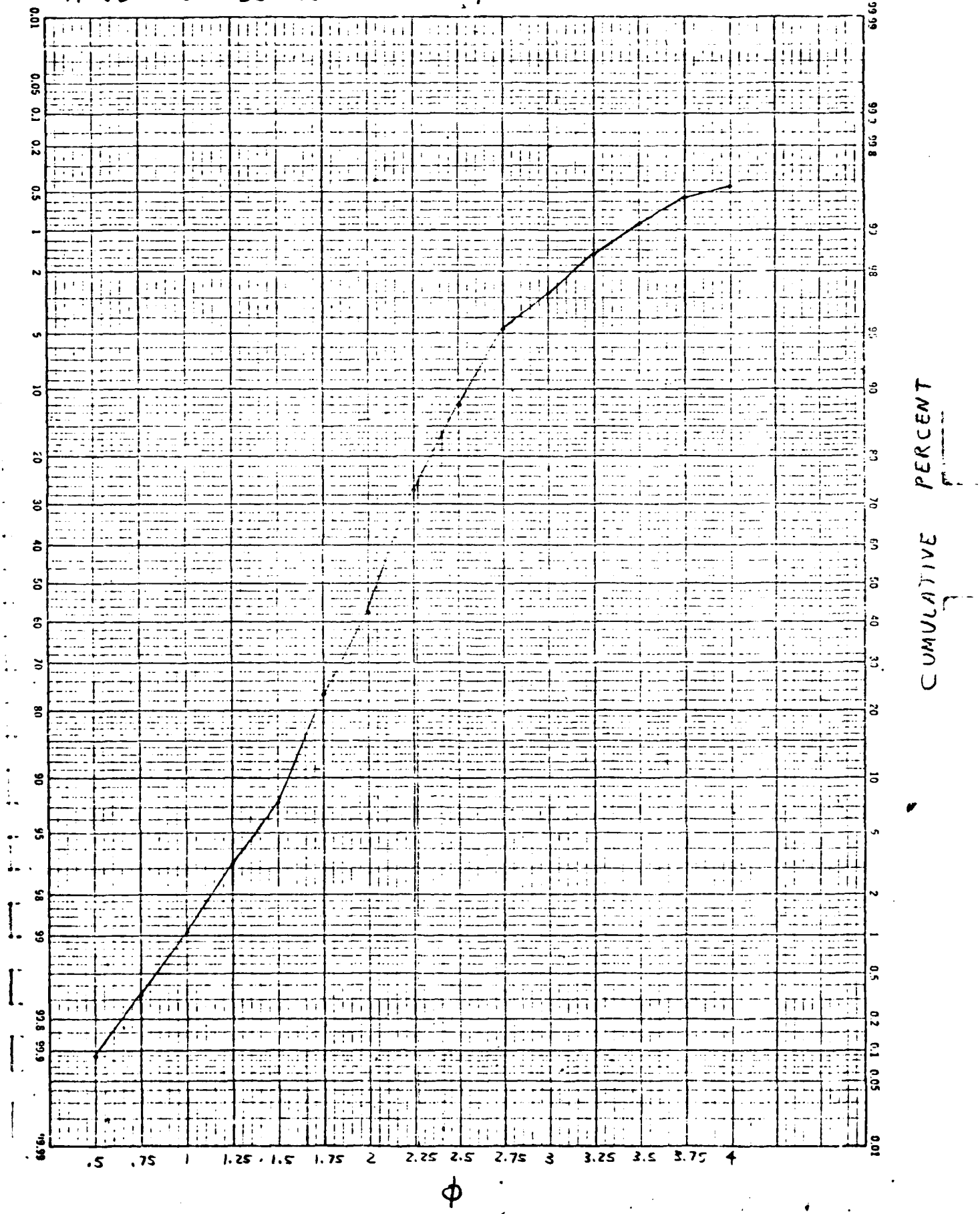
$$Sk = \frac{1.66 + 2.42 - 2(2.05)}{2(2.42 - 1.66)} + \frac{1.33 + 2.73 - 2(2.05)}{2(2.73 - 1.33)}$$

$$= -0.0132 + (-0.0143) = -0.0275$$

NEAR-SYMMETRICAL (FOLK)

Kurtosis :

$$K_G = \frac{2.73 - 1.33}{2.44(2.28 - 1.78)} = 1.1475$$


11 JD 126 SECTION 1 top of UNIT 1
CUMULATIVE PERCENT
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
.5 .75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4
Φ

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JO 126 SECTION 1

Sample No. middle (6") depth UNIT 2 Analyst Don Heller Date 12/21/81

Sample description color (dry) dark brown 10YR 4/3 (Munsell)

Summary of preliminary treatment wet-sieve for > 4ϕ fraction; dry-sieve >4ϕ; < 4ϕ retained for pipette

Total sample weight (W_s) 49.2493 g

Cumulative weight (W_c) 48.4963 g

Weight of split sample

Mesh	Size mm.	ϕ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
>4	0.71	0.50	0.0372				0.0372	0.077	0.077
-8	0.59	0.75	0.0414				0.0786	0.162	0.085
12	0.50	1.00	0.1411				0.2197	0.453	0.291
35	0.42	1.25	0.4181				0.6378	1.32	0.862
-2	0.35	1.50	0.6803				1.3181	2.72	1.40
18	0.30	1.75	2.6619				3.9800	8.21	5.49
60	0.25	2.00	3.8430				7.8230	16.13	7.92
5	0.21	2.25	6.8174				14.6404	30.19	14.06
80	0.177	2.50	4.2599				18.9003	38.97	8.78

20	0.149	2.75	2.6912				21.5915	44.52	5.55
15	0.125	3.00	1.1524				22.7439	46.90	2.38
150	0.105	3.25	0.8440				23.5879	48.64	1.74
70	0.082	3.50	0.6339				24.2218	49.95	1.31
200	0.074	3.75	0.4496				24.6714	50.87	0.922
50	0.0625	4.00	0.1649				24.8363	51.21	0.340
	0.031	5	1.2850				29.1213	60.05	8.84
	0.0156	6	4.9550				34.0763	70.27	10.22
	0.0078	7	3.3350				37.4113	77.14	6.86
	0.0039	8	1.9500				39.3613	81.16	4.02
	0.0020	9	1.6750				41.0363	84.62	3.45
		29	7.4640				48.4963	100	15.38

$$\text{Error } 1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = 0.77\%$$

PIPETTE ANALYSIS

11 JD 126 SECTION

Sample No. middle (6") depth UNIT 2 Analyst Don Heller Date 2/12/82

Sample description

Summary of preliminary treatment

Concentration of dispersing agents .516 g/l Volume of suspension 1,000 ml

Weight of sample 49.2493 g Weight coarser than 4 ϕ (S) 24.8363

Time zero 9:30 AM

Size	F	5ϕ	6ϕ	7ϕ	8ϕ	9ϕ	10ϕ			
Temperature	20°C									
Settling distance	20cm	10 cm	10 cm	10 cm	9 cm	5 cm				
Settling time	20 s	1m 56s	7m [illegible]	31m	2h 3m	4h 5m				
Time out										
Volume of aliquot	20ml	20ml	20 ml	[illegible]	[illegible]	[illegible]				
Weight beaker and residue	27.4972	27.4873	28.7679	27.3500	27.1779	28.3798				
Weight residue	.4835	.3978	.2987	.2320	.1930	.1595				
Weight dispersing agent in aliquot	.0103	.0103	.0103	.0103	.0103	.0103				
Weight sediment	.4732	.3875	.2884	.2217	.1827	.1492				
Total volume										
Aliquot volume										
P (or F)	23.6600	19.3750	14.42[illegible]	11.0850	9.1350	7.4600				
Weight size fraction		4.2850	4.9550	3.3350	1.9500	1.6750	7.4600			

11 JD 126 SECTION 1 middle (6) Upper UNIT 2

ϕ 5 ≈ 1.62 ϕ ϕ 75 ≈ 6.63 ϕ

ϕ 16 ≈ 1.18 ϕ ϕ 84 ≈ 8.81 ϕ

ϕ 25 ≈ 2.20 ϕ ϕ 95 ≈ 10.1 ϕ

ϕ 50 ≈ 3.50 ϕ

Mean:

$$M_Z = \frac{1.98 + 3.50 + 8.81}{3} = 4.76\ \phi$$

Standard deviation:

$$\sigma_I = \frac{8.81 - 1.98}{4} + \frac{10.10 - 1.62}{6.6} = 2.99$$

VERY POORLY SORTED

Skewness:

$$Sk = \frac{1.98 + 8.81 - 2(3.50)}{2(8.81 - 1.98)} + \frac{1.62 + 10.10 - 2(3.50)}{2(10.10 - 1.62)}$$

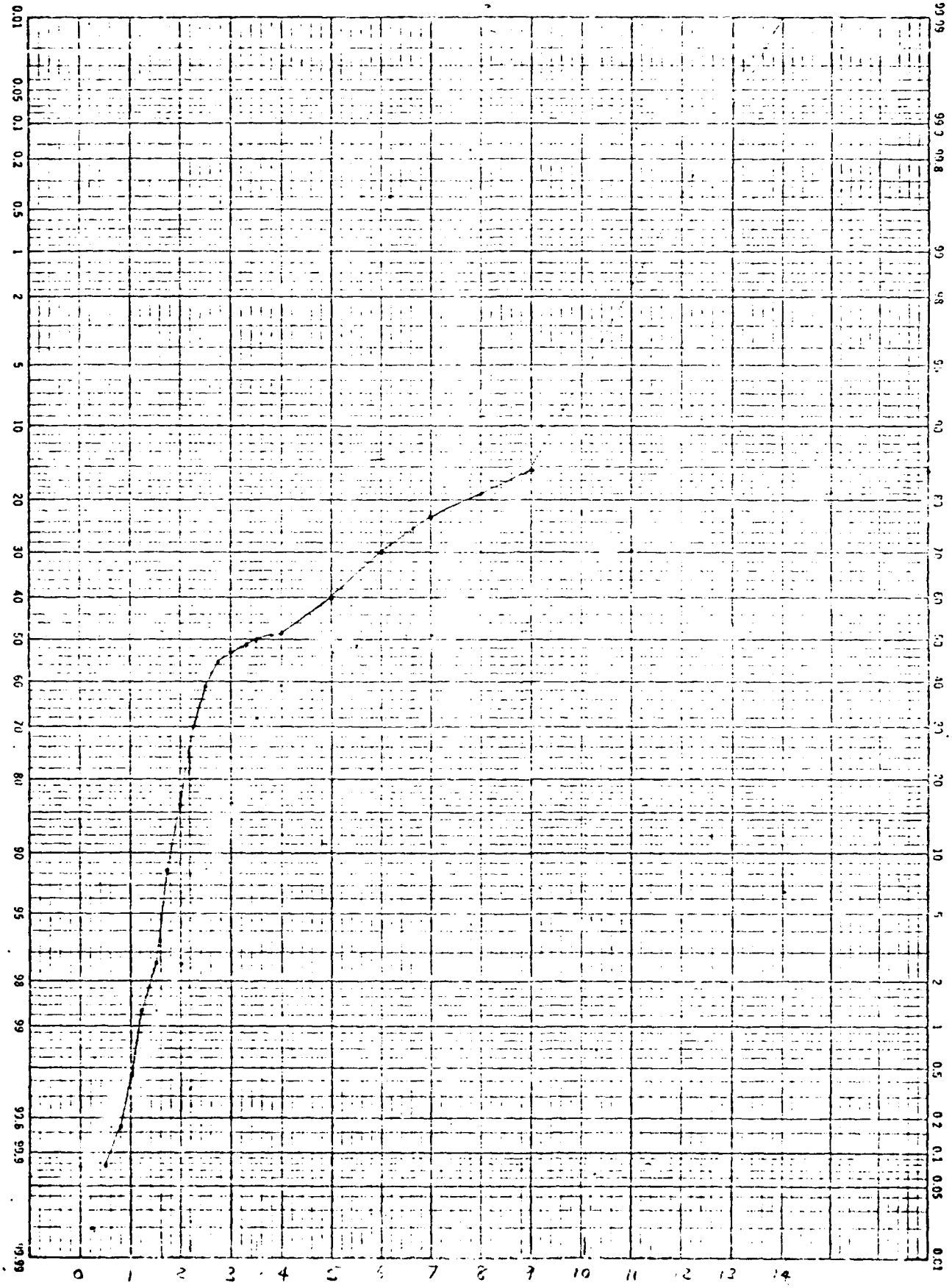
$$= 0.2775 + 0.2783 = 0.5558$$

STRONGLY FINE-SKEWED

Kurtosis:

$$K_G = \frac{10.10 - 1.62}{2.44(6.63 - 2.20)} = 0.7845$$

11 JD 126 SECTION 1 middle (6 / 1 ... UNIT 2



SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126

Sample No. CORE 1 0 - 10 cm Analyst Don Heller Date

Sample description color (dry): dark gray 10 YR 4/1 (M...)

Summary of preliminary treatment wet-sieve for > 4 ϕ; dry-sieve > 4 ϕ; < 4 ϕ retained for pipette

Total sample weight (W_s) 43.9397

Cumulative weight (W_c)

Weight of split sample

Mesh	Size mm.	ϕ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
28	0.59	[illegible]	0.1307				0.1307	0.301	0.301
32	0.50	1.00	0.1144				0.2453	0.564	0.263
35	0.42	1.25	0.3188				0.5641	1.30	0.735
42	0.35	1.50	0.9654				1.5295	3.52	2.22
48	0.30	1.75	3.6806				5.2101	11.98	8.47
60	0.25	2.00	5.8148				11.0249	25.35	13.37
35	0.21	2.25	10.3963				21.4212	49.27	23.91
80	0.177	2.50	5.9712				27.3924	63.00	13.73

100	0.149	3.75	3.5543				30.9470	71.18	8.16
115	0.125	3.00	0.4733				31.8973	73.36	2.17
150	0.105	3.25	0.4734				32.3712	74.45	1.09
170	0.088	3.50	0.3726				32.7438	75.31	0.857
200	0.074	3.75	0.3175				33.0613	76.04	0.730
270	0.0625	4.00	0.1331				33.1944	76.35	0.306
	0.031	5	2.0650				35.2594	81.09	4.75
	0.0156	6	2.2100				37.4694	86.18	5.09
	0.0078	7	1.9300				39.3994	90.62	4.44
	0.0039	8	1.2500				40.6494	93.49	2.87
	0.0020	9	0.9550				41.6044	95.69	2.20
		47	1.8750				43.4794	100	4.31

$$\text{Error } 1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = \frac{86.9588}{87.4} \times 100 = 0.527\ \%$$

PIPETTE ANALYSIS

Sample No. CORE 1 0 - 10 cm Analyst Don Reiger Date 2/12/83

Sample description

Summary of preliminary treatment

Concentration of dispersing agents .5% Calgon Volume of suspension 1,000 ml

Weight of sample 43.9377 g Weight coarser than 4 ϕ (S) 33.1744 g

Time zero 9:45 AM

Size	F	5 ϕ	6 ϕ	7 ϕ	8 ϕ	9 ϕ	-9 ϕ			
Temperature	20°C									
Settling distance	20 cm	20 cm	20 cm	20 cm	20 cm	5 cm				
Settling time	20 s	1m 5s	7m 45s	31m	2h 3m	4h 52m				
Time out										
Volume of aliquot	20 ml	20 ml	20 ml	20 ml	20 ml	20 ml				
Weight beaker and residue	29.1785	28.0286	37.0970	28.8942	27.9925	28.8900				
Weight residue	.2160	.1747	.1305	.0971	.0669	.0478				
Weight dispersing agent in aliquot	.0103	.0103	.0103	.0103	.0103	.0103				
Weight sediment	.2057	.1644	.1202	.0868	.0566	.0375				
Total volume										
Aliquot volume										
P (or F)	12.2850	8.2200	6.0100	4.0800	2.8300	1.8750				
Weight size fraction		2.0650	2.2100	1.9300	1.2500	0.9550	1.8750			

II JD 126 CORE 1 0 - 10 cm

Φ 5	1.55 ϕ	Φ 75	3.40 ϕ
Φ 16	1.81 ϕ	ϕ 84	5.53 ϕ
Φ 25	1.93 ϕ	ϕ 95	8.63 ϕ
Φ 50	2.25 ϕ		

Mean:

$$M_z = \frac{1.81 + 2.25 + 5.53}{3} = 3.20\ \phi$$

Standard Deviation:

$$\sigma_I = \frac{5.53 - 1.81}{4} + \frac{8.63 - 1.55}{6.6} = 2.00$$

POORLY SORTED

Skewness:

$$Sk = \frac{1.81 + 5.53 - 2(2.25)}{2(5.53 - 1.81)} + \frac{1.55 + 8.63 - 2(2.25)}{2(8.63 - 1.55)}$$

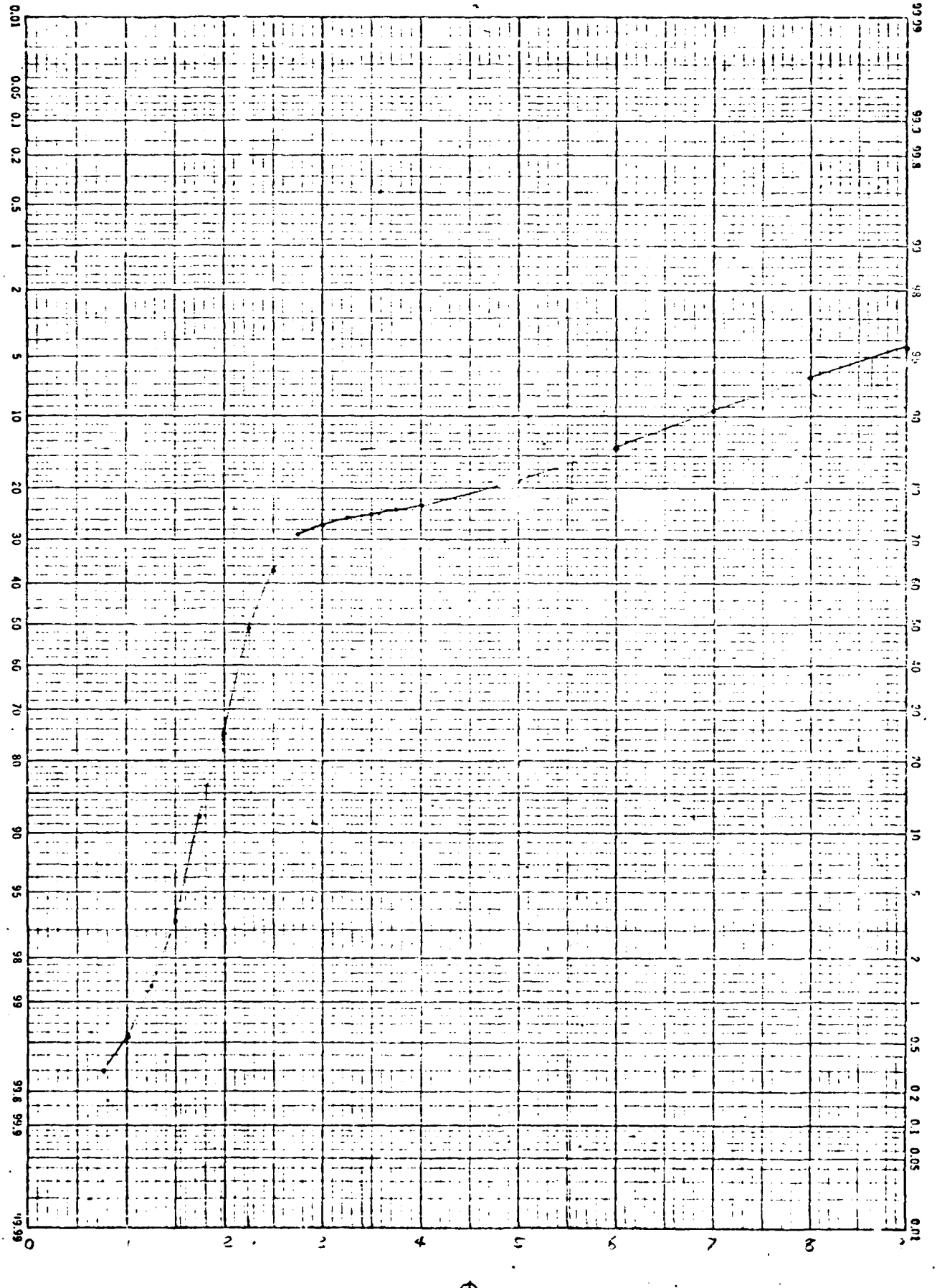
$$= 0.3817 + 0.4011 = 0.7828$$

STRONGLY FINE-SKEWED

Kurtosis:

$$K_G = \frac{8.63 - 1.55}{2.44(3.40 - 1.36)} = 2.043+$$

II JD 126 CORE 1 0 - 10 cm



SEDIMENT SIZE-FREQUENCY DISTRIBUTION

Sample No. 11 JD 126 CORE 1 10 cm Analyst Don Potter Date Jan 82

Sample description color (dry): [illegible]

Summary of preliminary treatment wet sieve for > 4 ϕ ; dry sieve < 4 ϕ retained for split

Total sample weight (W_s) 35.[illegible] g

Cumulative weight (W_c) 34.7378 g

Weight of split sample

Mesh	Size mm.	ϕ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
24	0.59	0.75	0.0213				0.0213	0.061	0.061
32	0.50	1.00	0.0824				0.1037	0.297	0.237
35	0.42	1.25	0.2704				0.3741	1.08	0.77
42	0.35	1.50	0.8772				1.2743	3.67	2.59
48	0.30	1.75	3.0289				4.3032	13.83	10.16
[illegible]	0.25	2.00	5.6284				10.4316	30.04	16.21
60	0.21	2.25	10.2327				20.6643	59.49	29.45
80	0.177	2.5	[illegible]				26.7483	77.01	17.52

100	0.149	2.[illegible]	3.[illegible]				30.3320	87.32	[illegible]
1[illegible]	0.125	3.[illegible]	0.[illegible]				31.2459	89.95	2.63
150	0.105	3.25	0.[illegible]				31.6549	91.13	1.18
180	0.088	3.[illegible]	0.[illegible]				31.9731	91.95	0.830
2[illegible]0	0.074	3.75	0.[illegible]				32.1570	92.57	0.616
250	0.0625	4.0[illegible]	0.[illegible]				32.2328	92.79	0.[illegible]
	0.031	5	0.6350				[illegible]	94.62	1.83
	0.0156	6	0.5800				[illegible]	96.29	1.67
	0.0078	7	0.[illegible]				[illegible]	97.43	1.14
	0.0039	[illegible]	0.[illegible]				34.1478	98.3	0.878
	0.0020	9	0.[illegible]				34.[illegible]	99.02	0.720
		[illegible]	0.[illegible]				34.[illegible]	[illegible]	0.979

$$\text{Error } 1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = 0.46[illegible]$$

PIPETTE ANALYSIS

11 JD 126

Sample No. CORE 1 .0 cm Analyst Dr. Heller Date 2/12/82

Sample description

Summary of preliminary treatment

Concentration of dispersing agents .516 g/l Volume of suspension 1000 ml

Weight of sample 35.0628 g Weight coarser than 4 ϕ (S) 32.0228 g

Time zero 10:30 AM

Size	F	5 ϕ	6 ϕ	7 ϕ	8 ϕ	9 ϕ	- ?			
Temperature	20°C									
Settling distance	20 cm	10 cm	10 cm	10 cm	5 cm	5 cm				
Settling time	20 s	1m 36s	7m 44s	31m	2h 3m	4h 3m				
Time out										
Volume of aliquot	20 ml	25 ml	25 ml	25 ml	25 ml	25 ml				
Weight beaker and residue	27.1055	27.9652	27.2250	27.8878	27.7370	27.0665				
Weight residue	.0604	.0477	.0361	.0282	.0221	.0171				
Weight dispersing agent in aliquot	.0103	.0103	.0103	.0103	.0103	.0103				
Weight sediment	.0501	.0374	.0258	.0179	.0118	.0068				
Total volume										
Aliquot volume										
P (or F)	2.5050	1.8700	1.2900	0.8950	0.5900	0.3400				
Weight size fraction		0.6350	0.5800	0.3950	0.3050	0.2500	0.3400			

11 JD 126 CORE 1 10 cm

ϕ 5 ≈ 1.54 ϕ ϕ 75 ≈ 2.47 ϕ

ϕ 16 ≈ 1.78 ϕ ϕ 84 ≈ 2.66 ϕ

ϕ 25 ≈ 1.92 ϕ ϕ 15 ≈ 5.22

ϕ 50 ≈ 2.17 ϕ

Mean :

$$M_Z = \frac{1.78 + 2.17 + 2.66}{3} = 2.20\ \phi$$

Standard Deviation :

$$\sigma_I = \frac{2.66 - 1.78}{4} + \frac{5.22 - 1.54}{6.6} = 0.7776$$

MODERATELY SORTED

Skewness :

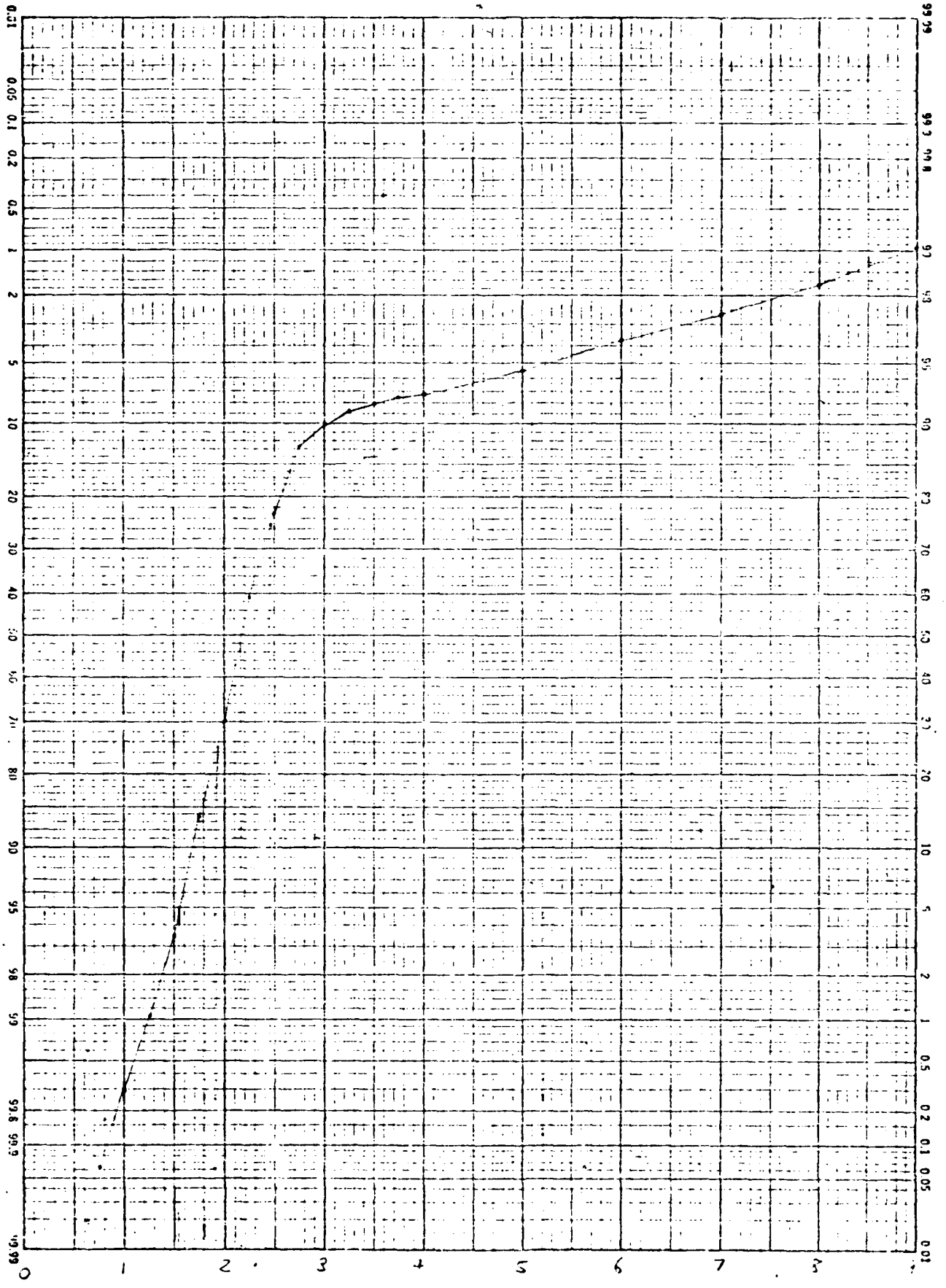
$$Sk = \frac{1.78 + 2.66 - 2(2.17)}{2(2.66 - 1.78)} + \frac{1.54 + 5.22 - 2(2.17)}{2(5.22 - 1.54)}$$

$$= 0.0568 + 0.3288 = 0.3856$$ STRONGLY FINE-SKEWED

Kurtosis :

$$K_G = \frac{5.22 - 1.54}{2.44(2.47 - 1.42)} = 2.7422$$

11 JD 126 CYCLE 1 10 cm.



SEDIMENT SIZE-FREQUENCY DISTRIBUTION

Sample No. 11 JD 126 CORE 1 30 cm Analyst Don Heller Date 8 Jan 82

Sample description color (dry): dark grayish brown 10YR 4/2 (Munsell)

Summary of preliminary treatment wet-sieve for > 4ϕ ; dry-sieve > 4ϕ ; < 4ϕ retained for pipette

Total sample weight (W_S) 49.7707 g

Cumulative weight (W_c) 49.5[illegible] g

Weight of split sample

Mesh	Size mm.	ϕ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
4	0.71	0.50	0.0359				0.035[illegible]	0.072	0.072
28	0.59	0.75	0.0233				0.0592	0.119	0.047
32	0.50	1.00	0.1061				0.1653	0.333	0.214
35	0.42	1.25	0.4569				0.6222	1.25	0.921
42	0.35	1.50	1.4598				2.0820	4.20	2.94
48	0.30	1.75	5.1314				7.2134	14.54	10.35
60	0.25	2.00	7.9520				15.1654	30.58	16.03
65	0.21	2.25	14.[illegible]				29.[illegible]	59.[illegible]	28.[illegible]

80	0.177	2.50	8.4752				37.9232	76.47	17.10
100	0.149	2.75	5.2155				43.1387	86.98	10.52
115	0.125	3.00	1.4425				44.5812	89.89	2.91
120	0.105	3.25	0.6866				45.2678	91.28	1.38
170	0.088	3.50	0.4887				45.7565	92.26	0.985
200	0.074	3.75	0.3632				46.1197	92.99	0.732
210	0.0625	4.00	0.1294				46.2491	93.25	0.261
	0.031	5	0.9150				47.1641	95.10	1.84
	0.0156	6	0.7050				47.8691	96.52	1.42
	0.0078	7	0.4800				48.3491	97.49	0.968
	0.0039	8	0.2700				48.6391	98.07	0.535
	0.0020	9	0.2450				48.8841	98.57	0.492
		<9	0.7000				49.5941	100.00	1.41

$$\text{Error } 1-\left(\frac{2W_c}{W_s-W_c}\right) \times 100 = 0.198\ \%$$

PIPETTE ANALYSIS

11 JD 103

Sample No. CORE 1 [illegible] Analyst [illegible] Date 2/[illegible]

Sample description

Summary of preliminary treatment

Concentration of dispersing agents .316 g/l Volume of suspension [illegible]

Weight of sample 47.7709 g Weight coarser than 4 ϕ (S) [illegible]

Time zero 10:45 AM

Size	F	5 ϕ	6 ϕ	7 ϕ	8 ϕ	[illegible]	[illegible]
Temperature	20°C						
Settling distance	20 cm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Settling time	20 s	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Time out							
Volume of aliquot	20 ml	[illegible]	[illegible]	[illegible]	[illegible]	20 ml	
Weight beaker and residue	27.1839	27.1774	27.2046	28.3777	27.0579	28.6817	
Weight residue	.0770	.0587	.0446	.0350	.0292	.0243	
Weight dispersing agent in aliquot	.0103	.0103	.0103	.0103	.0103	.0103	
Weight sediment	.0667	.0484	.0343	.0247	.0189	.0140	
Total volume							
Aliquot volume							
P (or F)	3.3350	2.4200	1.7150	1.2350	0.9450	0.7000	
Weight size fraction		0.9150	0.7050	0.4800	0.2950	0.2450	[illegible]

11 JD 126 CORE 1 30 cm

ϕ 5 = 1.51 : ϕ 75 = 2.4. :
ϕ 16 = .78 : ϕ 84 = 2.66 :
ϕ 25 = 1.1. : ϕ 95 = 4.1. :
ϕ 50 = 2.15 :

Mean :

$$M_Z = \frac{1.78 + 3.15 + 2.66}{3} = 2.20 :$$

Standard Deviation :

$$\sigma_I = \frac{2.66 - 1.78}{4} + \frac{4.90 - 1.51}{6.6} = 0.7336$$

MODERATELY SORTED

Skewness :

$$Sk = \frac{1.78 + 2.66 - 2(2.15)}{2(2.66 - 1.78)} + \frac{1.51 + 4.90 - 2(3.15)}{2(4.90 - 1.51)}$$

$$= 0.0795 + 0.3112 = 0.3907$$

STRONGLY FINE-SKEWED

Kurtosis :

$$K_G = \frac{4.90 - 1.51}{2.44(2.44 - 1.81)} = 2.4374$$

11 JD 126 CORE 1 30 [illegible]

ϕ 5 = 1.51 : 75 2.4[illegible] :

ϕ 16 = .78 : 84 2.6[illegible] :

ϕ 25 = 1.[illegible] : 95 4.[illegible] :

ϕ 50 = 2.15 :

Mean :

$$M_z = \frac{1.78 + 2.15 + 2.66}{3} = 2.2[illegible] :$$

Standard Deviation :

$$\sigma_I = \frac{2.66 - 1.78}{4} + \frac{4.[illegible] - 1.51}{6.6} = 0.7336$$

MODERATELY SORTED

Skewness :

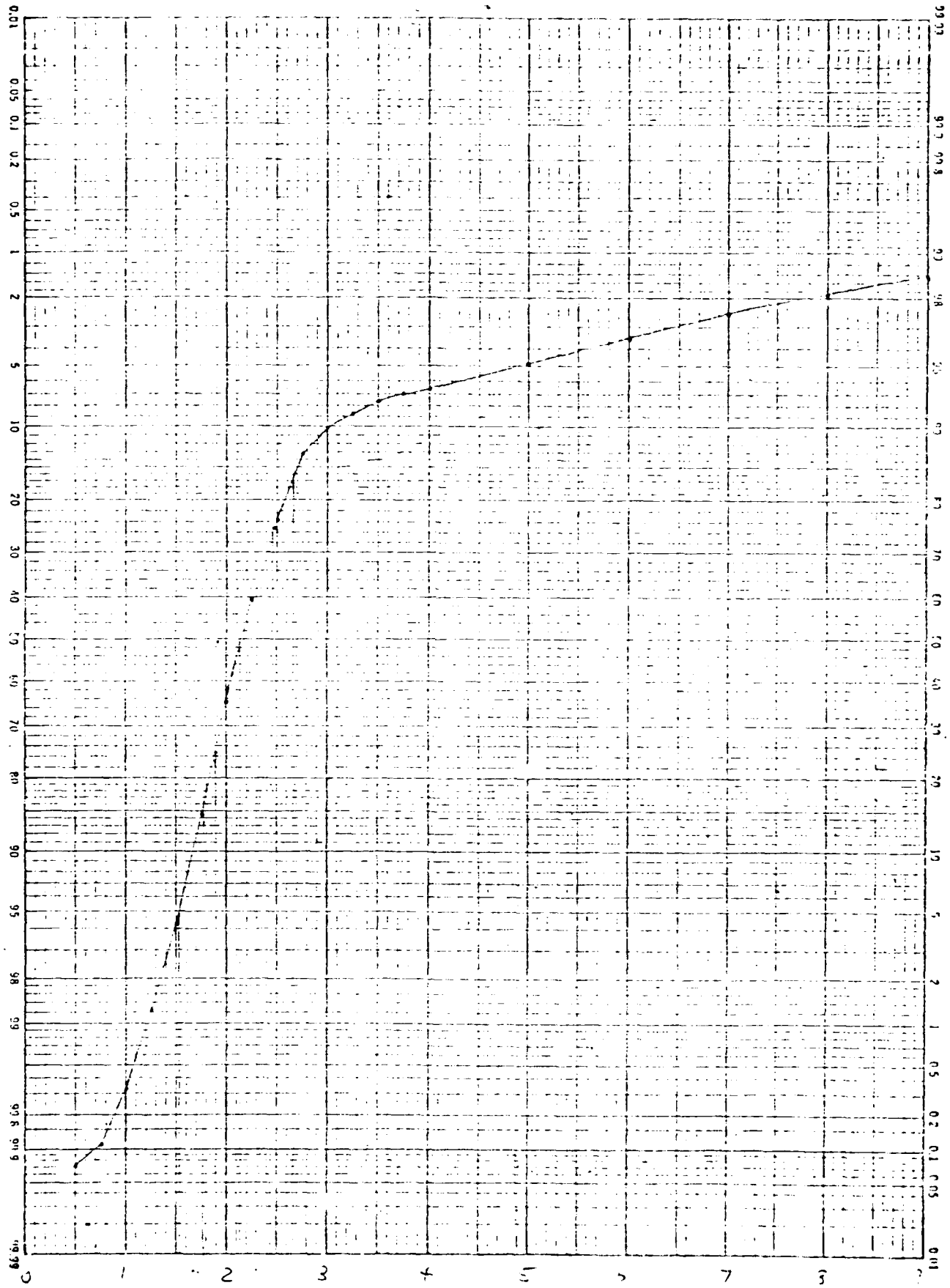
$$Sk = \frac{1.78 + 2.6[illegible] - 2(2.15)}{2(2.66 - 1.78)} + \frac{1.51 + 4.[illegible] - 2(2.15)}{2(4.[illegible] - 1.51)}$$

$$= 0.0795 + 0.3112 = 0.3907$$

STRONGLY FINE-SKEWED

Kurtosis :

$$K_G = \frac{4.[illegible] - 1.5[illegible]}{2.44(2.4[illegible] - 1.81)} = 2.43[illegible]$$



SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126

Sample No. CORE 1 70 cm Analyst Don Heller Date 15 Jan 22

Sample description color (dry): brown 10YR 5/3 (Munsell)

Summary of preliminary treatment: Sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 51.3384 g

Cumulative weight (W_c) 51.2390 g

Weight of split sample

..esh	Size mm.	ϕ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
-4	0.71	0.50	0.0175				0.0175	0.034	0.034
28	0.59	0.75	0.0325				0.0500	0.098	0.063
32	0.50	1.00	0.1246				0.1746	0.340	0.243
35	0.42	1.25	0.5318				0.7064	1.38	1.04
42	0.35	1.50	2.0164				2.7228	5.31	3.94
48	0.30	1.75	7.5525				10.2753	20.05	14.74
60	0.25	2.00	9.9086				20.1839	39.39	19.34
65	0.21	2.25	16.4099				36.5938	71.42	32.03
80	0.177	2.50	8.3724				44.9662	87.76	16.34
100	0.149	2.75	4.5347				49.5009	96.61	8.85
115	0.125	3.00	0.9658				50.4667	98.49	1.88
170	0.105	3.25	0.3671				50.8338	99.21	0.716
110	0.088	3.50	0.1882				51.0220	99.58	0.367
200	0.074	3.75	0.0841				51.1061	99.74	0.164
250	0.0625	4.00	0.0242				51.1303	99.79	0.047
		< 4	0.1087				51.2390	100	0.212

$$\text{Error } 1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = 0.097\ \%$$

11 JD 126 CORE 1 70 cm.

ϕ 5 ≈ 1.47 ϕ ϕ 75 ≈ 2.29 ϕ

ϕ 16 ≈ 1.69 ϕ ϕ 84 ≈ 2.43 ϕ

ϕ 25 ≈ 1.82 ϕ ϕ 95 ≈ 2.68 ϕ

ϕ 50 ≈ 2.07 ϕ

Mean:

$$M_z = \frac{1.69 + 2.07 + 2.43}{3} = 2.06\ \phi$$

Standard Deviation:

$$\sigma_I = \frac{2.43 - 1.69}{4} + \frac{2.68 - 1.47}{6.6} = 0.3683$$

WELL SORTED (FOLK)

Skewness:

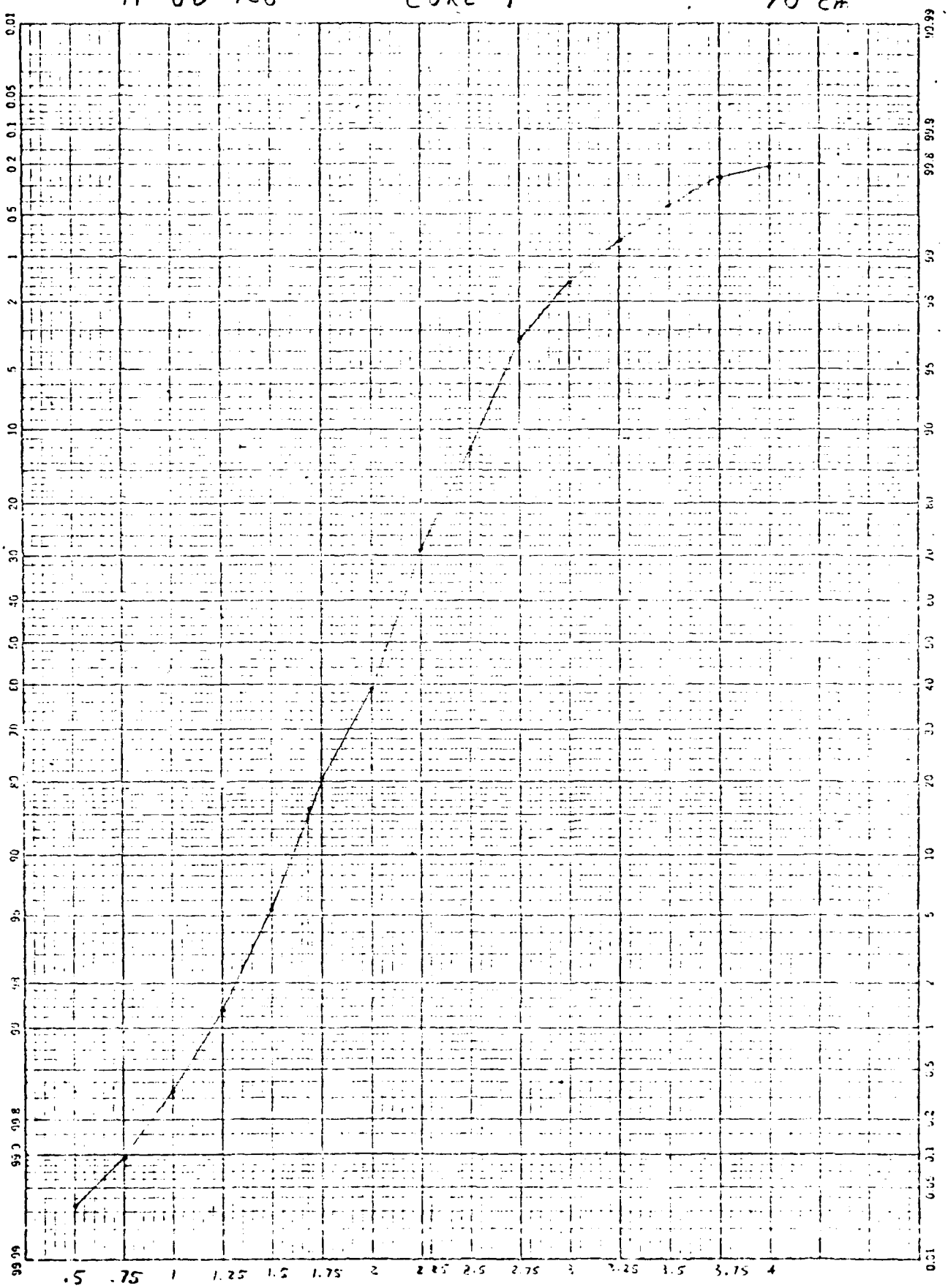
$$Sk = \frac{1.69 + 2.43 - 2(2.07)}{2(2.43 - 1.69)} + \frac{1.47 + 2.68 - 2(2.07)}{2(2.68 - 1.47)}$$

$$= -0.0135 + 0.0041 = -0.0094$$

NEAR - SYMMETRICAL (FOLK)

Kurtosis:

$$K_G = \frac{2.68 - 1.47}{2.44(2.29 - 1.82)} = 1.0551$$


11 JD 126
CORE 1
70 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.99
.5
.75
1
1.25
1.5
1.75
2
2.25
2.5
2.75
3
3.25
3.5
3.75
4
φ.

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126

Sample No. CORE 1 90 cm Analyst Don Heller Date 12/23/81

Sample description quartz sand; color (dry): yellowish brown 10 YR 5/4 (Munsell)

Summary of preliminary treatment Sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 41.8578 g

Cumulative weight (W_c) 41.8103 g

Weight of split sample

Mesh	Size mm.	φ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
4	0.71	0.50	0.0278				0.0278	0.07	0.07
20	0.59	0.75	0.0452				0.0730	0.17	0.11
32	0.50	1.00	0.1930				0.2660	0.64	0.46
35	0.42	1.25	0.5546				0.8206	1.96	1.33
42	0.35	1.50	1.4567				2.2773	5.45	3.42
18	0.30	1.75	5.5175				7.7968	18.65	13.20
0	0.25	2.00	7.8475				15.6443	37.42	18.77
55	0.21	2.25	13.6933				29.3396	70.17	32.75
0	0.177	2.50	7.2392				36.5788	87.49	17.31
00	0.149	2.75	3.9517				40.5365	96.95	9.47
5	0.125	3.00	0.7921				41.3286	98.85	1.89
0	0.105	3.25	0.2784				41.6070	99.51	0.67
0	0.088	3.50	0.1114				41.7184	99.78	0.27
0	0.074	3.75	0.039				41.7575	99.87	0.09
0	0.0625	4.00	0.0121				41.7696	99.90	0.03
		< 4	0.0412				41.8108	100	0.10

83.6216

Error $1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = 0.056\ \%$

83.6566

11 JO 126 COKE 1 90 cm

Φ 5 ≈ 1.47 ϕ Φ 75 ≈ 2.28 ϕ

Φ 16 ≈ 1.72 ϕ Φ 84 ≈ 2.43 ϕ

Φ 25 ≈ 1.84 ϕ Φ 95 ≈ 2.68 ϕ

Φ 50 ≈ 2.08 ϕ

Mean :

$$M_z = \frac{1.72 + 2.08 + 2.43}{3} = 2.08\ \phi$$

Standard Deviation :

$$\sigma_I = \frac{2.43 - 1.72}{4} + \frac{2.68 - 1.47}{6.6} = 0.3608$$

WELL SORTED (FOLK)

Skewness :

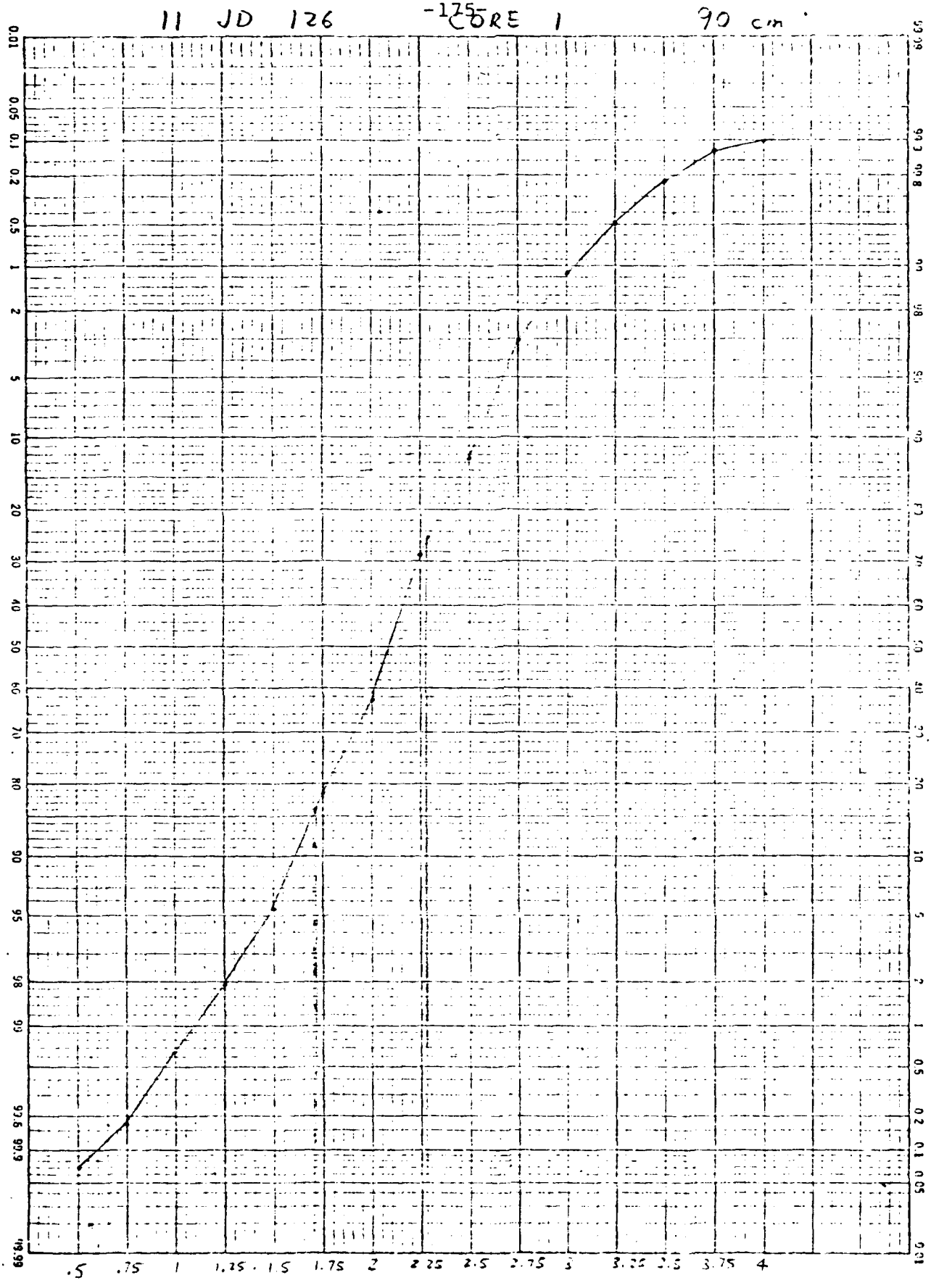
$$Sk = \frac{1.72 + 2.43 - 2(2.08)}{2(2.43 - 1.72)} + \frac{1.47 + 2.68 - 2(2.08)}{2(2.68 - 1.47)}$$

$$= -0.007 + (-0.004) = -0.011$$

NEAR - SYMMETRICAL (FOLK)

Kurtosis :

$$K_G = \frac{2.68 - 1.47}{2.44(2.28 - 1.84)} = 1.127$$


11 JD 126 -175- CORE 1 90 cm
CUMULATIVE PERCENT
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.6 99.9 99.99
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
.5 .75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126

Sample No. CORE 1 110 cm Analyst Don Heller Date 12/23/81

Sample description quartz sand; color (dry) yellowish brown 10 YR 5/4 (Munsell)

Summary of preliminary treatment Sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 37.6665 g

Cumulative weight (W_c) 37.5991 g

Weight of split sample

Mesh	Size mm.	φ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
4	0.71	0.50	0.0634				0.0634	0.17	0.17
8	0.59	0.75	0.1472				0.2106	0.56	0.39
32	0.50	1.00	0.4948				0.7054	1.88	1.32
5	0.42	1.25	0.9078				1.6132	4.29	2.41
42	0.35	1.50	1.2454				2.8586	7.60	3.31
78	0.30	1.75	3.3633				6.2219	16.55	8.95
0	0.25	2.00	5.3544				11.5763	30.79	14.24
65	0.21	2.25	11.6630				23.2393	61.81	31.02
00	0.177	2.50	7.9125				31.1518	82.85	21.04
00	0.149	2.75	4.8798				36.0316	95.83	12.98
15	0.125	3.00	0.9870				37.0185	98.46	2.63
20	0.105	3.25	0.3170				37.3355	99.30	0.84
70	0.088	3.50	0.1465				37.4821	99.69	0.39
00	0.074	3.75	0.0520				37.5341	99.83	0.14
50	0.0625	4.00	0.0163				37.5504	99.87	0.04
		4+	0.0487				37.5991	100	0.13

75.1982

$$\text{Error } 1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = 0.09\ \%$$

75.2656

11 JD 126 CORE 1 110 cm

$\phi 5 \approx 1.3333\ \phi$ $\phi 50 \approx 2.16\ \phi$

$\phi 16 \approx 1.7\ \phi$ $\phi 75 \approx 2.4\ \phi$

$\phi 25 \approx 1.91\ \phi$ $\phi 84 \approx 2.52\ \phi$

$\phi 95 \approx 2.73\ \phi$

Mean :

$$M_z = \frac{1.7 + 2.16 + 2.52}{3} = 2.13\ \phi$$

Standard Deviation :

$$\sigma_I = \frac{2.52 - 1.7}{4} + \frac{2.73 - 1.3333}{6.6} = 0.417\ \phi$$

WELL SORTED (FOLK)

Skewness :

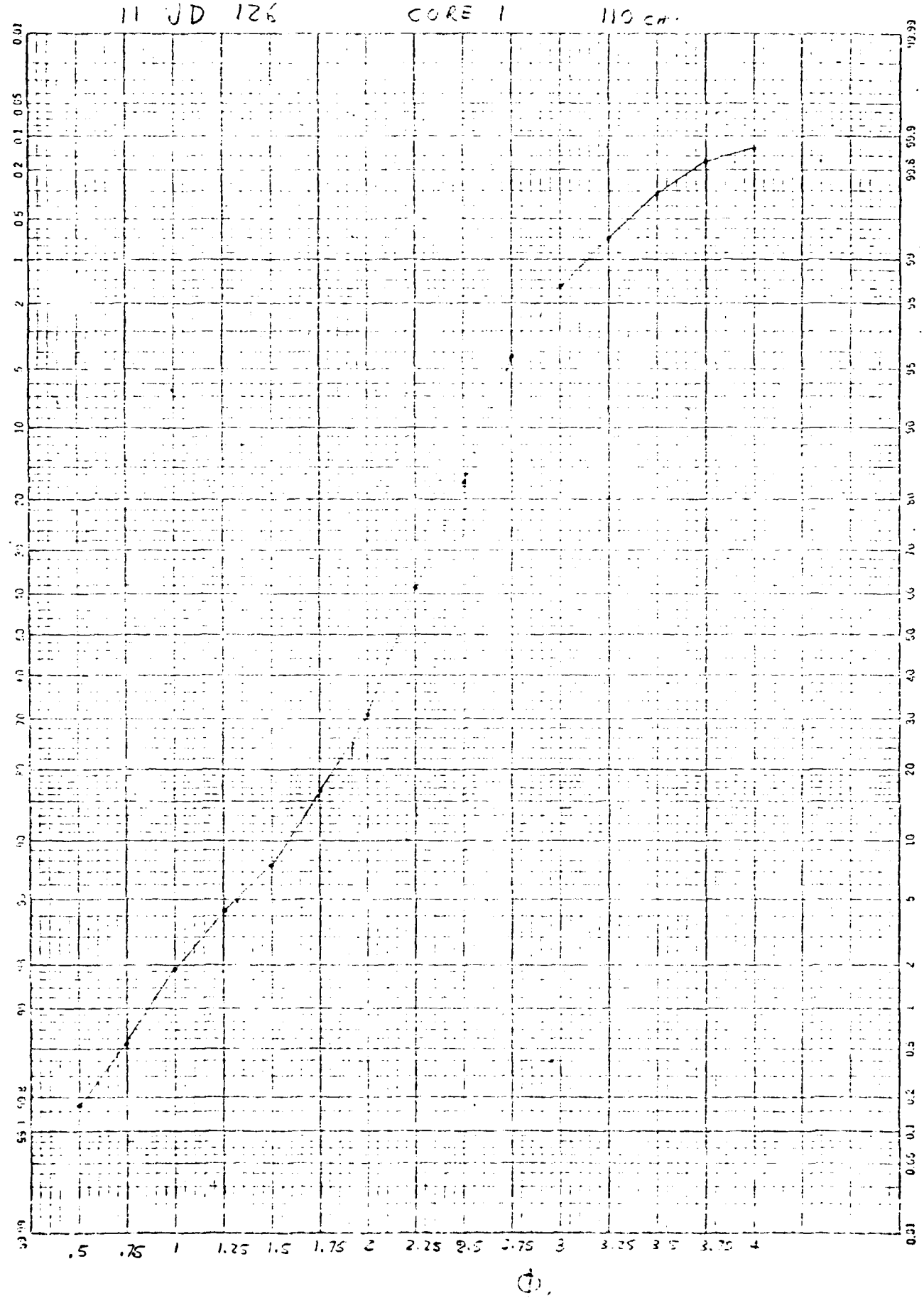
$$Sk = \frac{1.7 + 2.52 - 2(2.16)}{2(2.52 - 1.7)} + \frac{1.3333 + 2.73 - 2(2.16)}{2(2.73 - 1.3333)}$$

$$= -0.061 + (-0.092) = -0.153$$

COARSE - SKEWED (FOLK)

Kurtosis :

$$K_G = \frac{2.73 - 1.3333}{2.44(2.4 - 1.91)} = 1.168$$


11 JD 126
CORE 1
110 cm
.5
.75
1
1.25
1.5
1.75
2
2.25
2.5
2.75
3
3.25
3.5
3.75
4

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JO 126

Sample No. CORE 1 130cm (2md) Analyst Dr. Heller Date 12/23/31

Sample description quartz sand; color (dry): yellowish brown 10 YR 5/4 (Munsell)

Summary of preliminary treatment Sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 48.9643 g

Cumulative weight (W_c) 48.3851 g

Weight of split sample

Mesh	Size mm.	φ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
24	0.71	0.50	0.0359				0.0359	0.07	0.07
28	0.51	0.75	0.0585				0.0944	0.19	0.12
35	0.50	1.00	0.2717				0.3661	0.75	0.56
32	0.42	1.25	0.7001				1.0662	2.18	1.43
42	0.35	1.50	1.2236				2.2898	4.68	2.50
48	0.30	1.75	4.9562				7.2460	14.82	10.14
60	0.25	2.00	7.8339				15.0799	30.85	16.03
60	0.21	2.25	15.9952				31.075	63.57	32.72
80	0.177	2.50	9.2671				40.3422	82.52	18.95
100	0.149	2.75	5.7354				46.0776	94.26	11.73
115	0.125	3.00	1.4382				47.5158	97.20	2.94
150	0.105	3.25	0.6369				48.1527	98.50	1.30
170	0.088	3.50	0.3555				48.5082	99.23	0.73
200	0.074	3.75	0.1631				48.6713	99.56	0.33
270	0.0625	4.00	0.0435				48.7148	99.65	0.09
		4+	0.1703				48.8851	100	0.35

97.7702

Error $1-\left(\frac{2W_c}{W_s\ W_c}\right) \times 100 =$ 0.[illegible]%

97.8494

II JD 126 CORE 1 130 cm.

$\phi 5 \approx 1.52\ \phi$ $\phi 75 \approx 2.39\ \phi$

$\phi 16 \approx 1.72\ \phi$ $\phi 84 \approx 2.53\ \phi$

$\phi 25 \approx 1.88\ \phi$ $\phi 95 \approx 2.78\ \phi$

$\phi 50 \approx 2.13\ \phi$

Mean:

$$M_Z = \frac{1.72 + 2.13 + 2.53}{3} = 2.13\ \phi$$

Standard Deviation:

$$\sigma_I = \frac{2.53 - 1.72}{4} + \frac{2.78 - 1.52}{5.6} = 0.3934$$

WELL SORTED (FOLK)

Skewness:

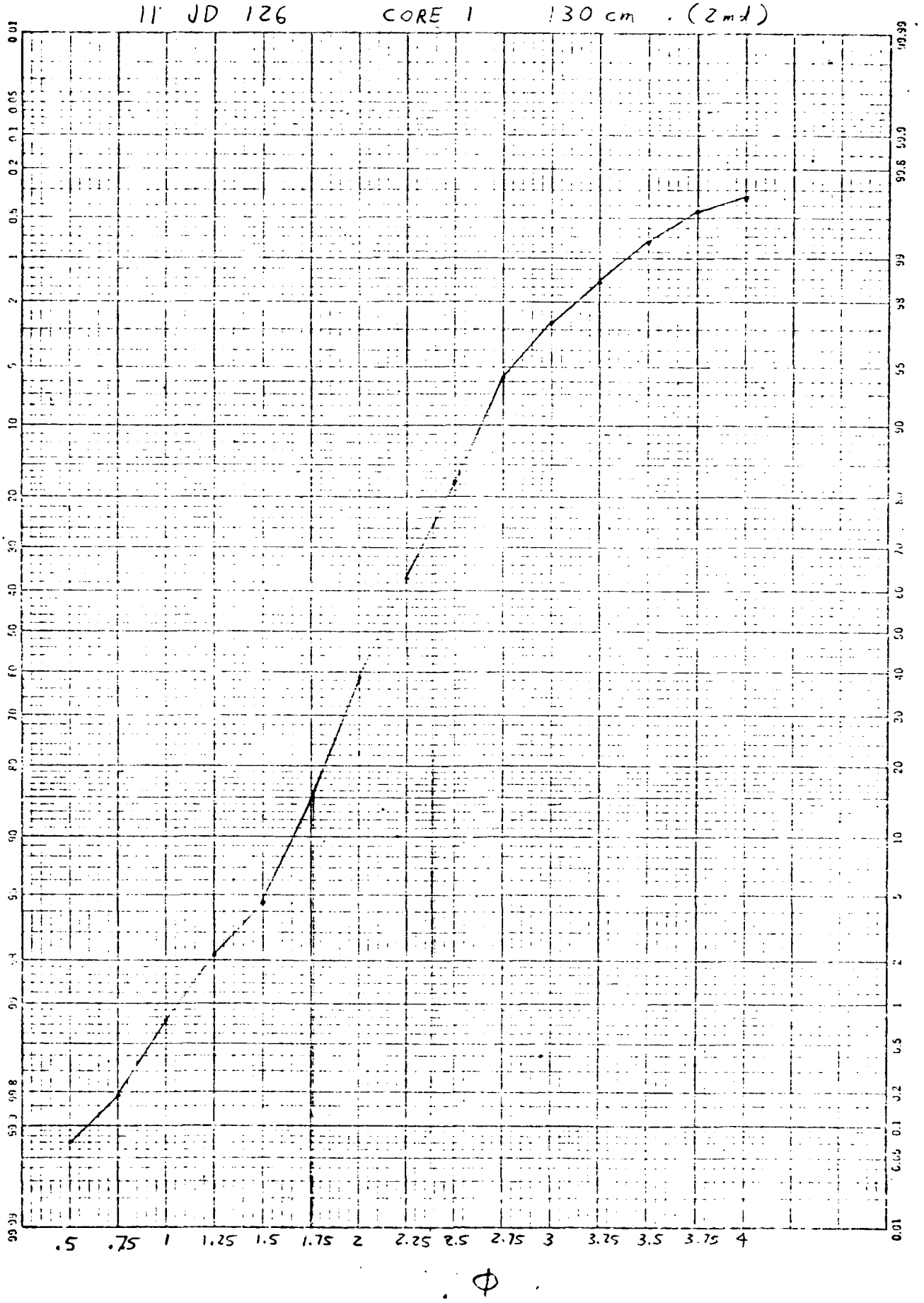
$$Sk = \frac{1.72 + 2.53 - 2(2.13)}{2(2.53 - 1.72)} + \frac{1.52 + 2.78 - 2(2.13)}{2(2.78 - 1.52)}$$

$$= -0.006 + 0.0317 = 0.0257$$

NEAR-SYMMETRICAL (FOLK)

Kurtosis:

$$K_G = \frac{2.78 - 1.52}{2.44(2.39 - 1.88)} = 1.0125$$


II JD 126 CORE 1 130 cm . (2md)
.5 .75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4
Φ
CUMULATIVE PERCENT

AD-A118 799 GREAT LAKES ARCHAEOLOGICAL RESEARCH CENTER INC WAUKE--ETC F/G 5/6
PRELIMINARY INVESTIGATIONS: ARCHAEOLOGY AND SEDIMENT GEOMORPHOL--ETC(U)
FEB 82 R F BOSZHARDT, D F OVERSTREET DACW25-81-C-0045

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SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 126

Sample No. CORE 1 150 cm Analyst Don Heller Date 12/22/81

Sample description quartz sand, color (dry): yellowish brown 10YR 5/4 (Munsell)

Summary of preliminary treatment Sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 51.2115 g

Cumulative weight (W_c) 51.1831 g

Weight of split sample

Mesh	Size mm.	φ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
24	0.71	0.50	0.0431				0.0431	0.08	0.08
28	0.59	0.75	0.0577				0.1008	0.20	0.11
32	0.50	1.00	0.2425				0.3433	0.67	0.47
35	0.42	1.25	0.7484				1.0917	2.13	1.46
42	0.35	1.50	1.6312				2.7229	5.32	3.19
48	0.30	1.75	6.2688				8.9917	17.57	12.25
60	0.25	2.00	8.6820				17.6737	34.53	16.96
65	0.21	2.25	16.4593				34.1330	66.69	32.16
80	0.177	2.50	9.4782				43.6112	85.21	18.52
100	0.149	2.75	5.4505				49.0617	95.86	10.65
115	0.125	3.00	1.2023				50.2640	98.20	2.35
150	0.105	3.25	0.4630				50.7270	99.11	0.90
170	0.088	3.50	0.2345				50.9615	99.57	0.46
200	0.074	3.75	0.1054				51.0669	99.77	0.21
250	0.0625	4.00	0.0300				51.0969	99.83	0.06
		<4	0.0862				51.1831	100	0.17

$$\text{Error } 1 - \left(\frac{2W_c}{W_s\ W_c}\right) \times 100 = \frac{102.3662}{102.3946} \times 100 = 0.028\ \%$$

11 JD 126 CORE 1 150 cm

$\phi 5 \approx 1.47\,\phi$ $\phi 75 \approx 2.35\,\phi$

$\phi 16 \approx 1.74\,\phi$ $\phi 84 \approx 2.47\,\phi$

$\phi 25 \approx 1.87\,\phi$ $\phi 95 \approx 2.73\,\phi$

$\phi 50 \approx 2.12\,\phi$

Mean :

$$M_z = \frac{1.74 + 2.12 + 2.47}{3} = 2.11\,\phi$$

Standard Deviation :

$$\sigma_I = \frac{2.47 - 1.74}{4} + \frac{2.73 - 1.47}{6.6} = 0.3734$$

WELL SORTED (FOLK)

Skewness :

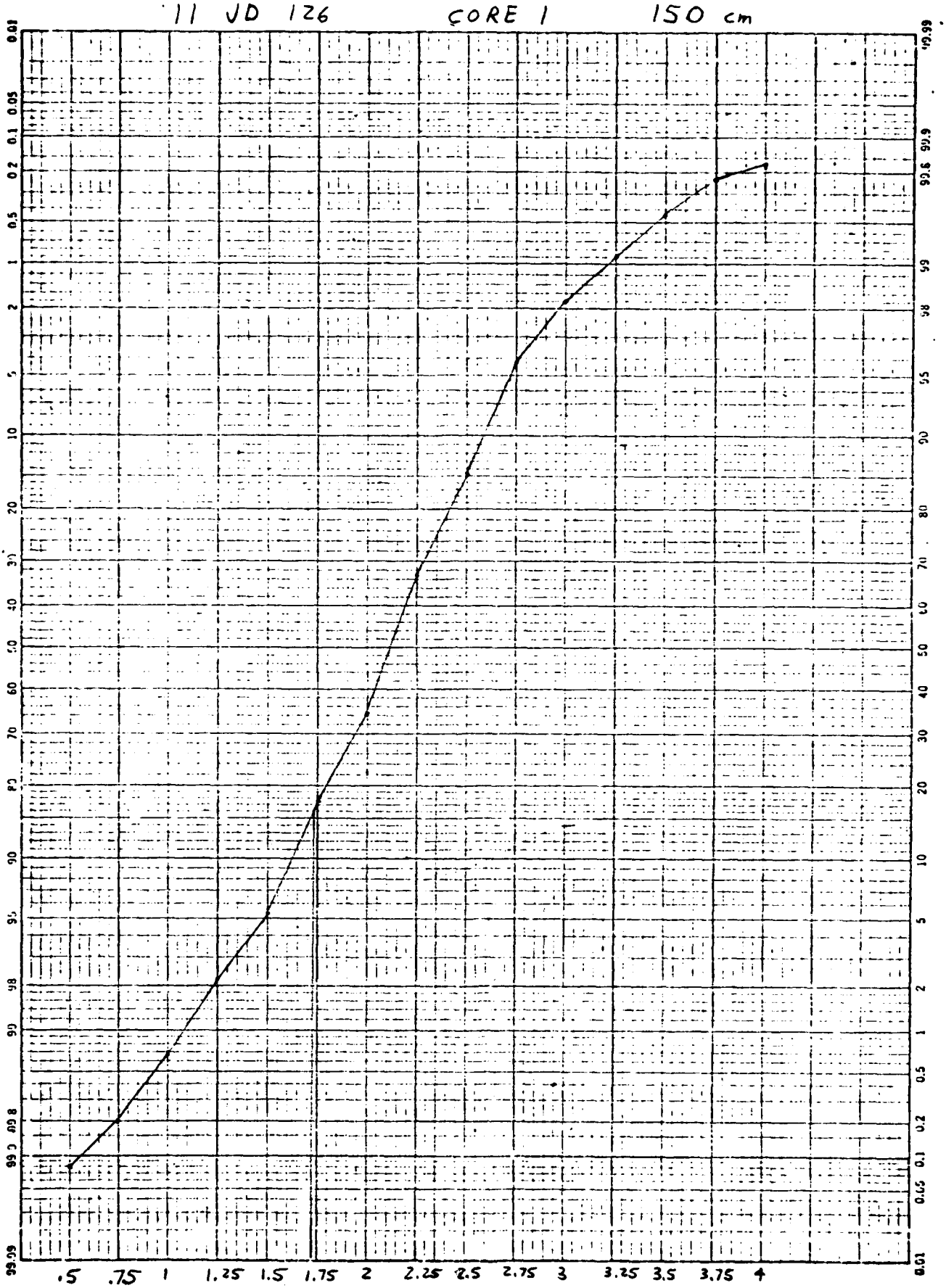
$$Sk = \frac{1.74 + 2.47 - 2(2.12)}{2(2.47 - 1.74)} + \frac{1.47 + 2.73 - 2(2.12)}{2(2.73 - 1.47)}$$

$$= -0.0205 + (-0.0159) = -0.0364$$

NEAR-SYMMETRICAL (FOLK)

Kurtosis :

$$K_G = \frac{2.73 - 1.47}{2.44(2.35 - 1.87)} = 1.0758$$


11 JD 126 CORE 1 150 cm
CUMULATIVE PERCENT
.5 .75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4

SEDIMENT SIZE-FREQUENCY DISTRIBUTION

11 JD 125

Sample No. CORE 1 155 cm Analyst Don Heller Date 12/22/81

Sample description color (dry): yellowish brown 10 YR 5/4 (Munsell) quartz sand

Summary of preliminary treatment sand fraction large enough to only require dry-sieving.

Total sample weight (W_s) 38.8774 g

Cumulative weight (W_c) 38.7497 g

Weight of split sample

Mesh	Size mm.	φ	Weight	% aggregates	Splitting factor	Corrected weight	Cumulative weight	Cumulative percent	Individual percent
4	0.71	0.50	0.0214				0.0214	0.055	0.055
8	0.59	0.75	0.0324				0.0538	0.14	0.08
12	0.50	1.00	0.1683				0.2221	0.57	0.43
5	0.42	1.25	0.5988				0.8209	2.12	1.55
42	0.35	1.50	1.2516				2.0725	5.35	3.23
8	0.30	1.75	4.9234				6.9959	18.05	12.71
0	0.25	2.00	7.0857				14.0816	36.34	18.29
65	0.21	2.25	12.3107				26.3923	68.11	31.77
0	0.177	2.50	6.9044				33.2967	85.93	17.82
00	0.149	2.75	3.5758				36.8725	95.16	9.23
15	0.125	3.00	0.9240				37.7965	97.54	2.38
50	0.105	3.25	0.3951				38.1916	98.56	1.02
70	0.088	3.50	0.2107				38.4023	99.10	0.54
00	0.074	3.75	0.1114				38.5137	99.39	0.29
50	0.0625	4.00	0.0366				38.5503	99.49	0.09
		4	0.1994				38.7497	100	0.51

77.4994

Error $1-\left(\frac{2W_c}{W_s+W_c}\right) \times 100 = 0.165\ \%$

77.6271

11 JD 125 CORE 1 155 cm

$\phi 5 \approx 1.47\ \phi$ $\phi 75 \approx 2.33\ \phi$

$\phi 16 \approx 1.72\ \phi$ $\phi 84 \approx 2.47\ \phi$

$\phi 25 \approx 1.85\ \phi$ $\phi 95 \approx 2.74\ \phi$

$\phi 50 \approx 2.11\ \phi$

Mean:

$$M_z = \frac{1.72 + 2.11 + 2.47}{3} = 2.10\ \phi$$

Standard Deviation:

$$\sigma_I = \frac{2.47 - 1.72}{4} + \frac{2.74 - 1.41}{6.6} = 0.38$$

WELL SORTED (FOLK)

Skewness:

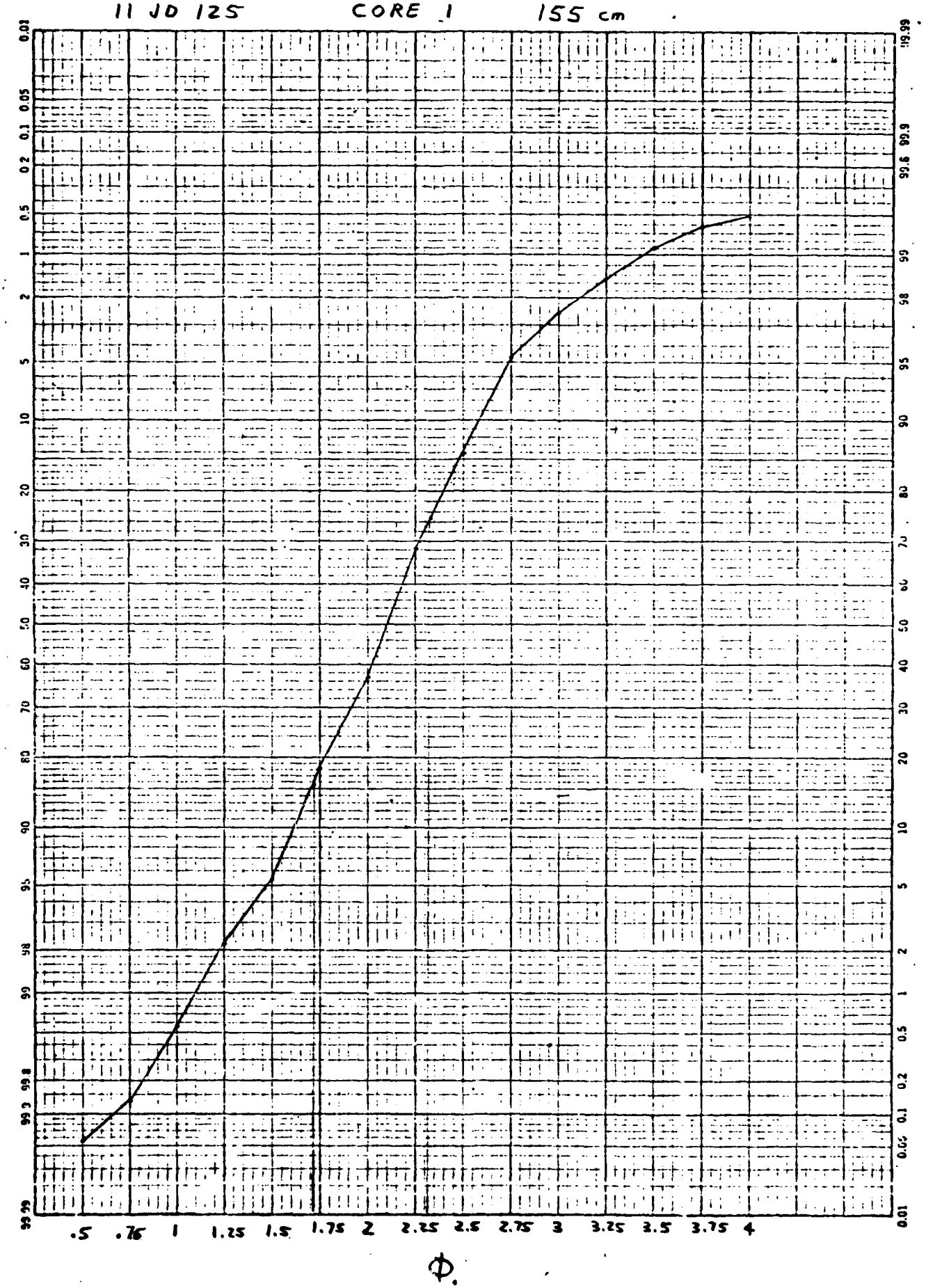
$$Sk = \frac{1.72 + 2.47 - 2(2.11)}{2(2.47 - 1.72)} + \frac{1.47 + 2.74 - 2(2.11)}{2(2.74 - 1.47)}$$

$$= -0.02 + (-0.008) = -0.028$$

NEAR-SYMMETRICAL (FOLK)

Kurtosis:

$$K_G = \frac{2.74 - 1.47}{2.44(2.33 - 1.85)} = 1.084$$


11 JD 125
CORE 1
155 cm
CUMULATIVE PERCENT
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
.5 .75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4
Φ